

MILITARY APPLICATIONS OF NUCLEAR TECHNOLOGY

HEARING
BEFORE THE
SUBCOMMITTEE ON MILITARY APPLICATIONS
OF THE
JOINT COMMITTEE ON ATOMIC ENERGY
CONGRESS OF THE UNITED STATES
NINETY-THIRD CONGRESS
FIRST SESSION
ON
THE CONSIDERATION OF MILITARY APPLICATIONS OF
NUCLEAR TECHNOLOGY

APRIL 16, 1973

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[NOTE. This hearing was held in executive session. Classified security information was presented during the executive session. The hearing record was then reviewed and specific items designated by the AEC as being classified information were deleted prior to publication.]

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MILITARY APPLICATIONS OF NUCLEAR TECHNOLOGY

MONDAY, APRIL 16, 1973

SUBCOMMITTEE ON MILITARY APPLICATIONS,
JOINT COMMITTEE ON ATOMIC ENERGY,
CONGRESS OF THE UNITED STATES,
Washington, D.C.

The Subcommittee on Military Applications met, pursuant to call, at 10 a.m., room H-405, the Capitol, Hon. Stuart Symington (chairman of the subcommittee) presiding.

Present: Senators Symington and Baker; and Representatives Holifield and Hosmer, of the subcommittee.

Also present: Senators Aiken and Dominick; and Representatives Price, Young, McCormack, Hansen, and Lujan of the full committee.

Staff members present: Edward J. Bauser, executive director; George F. Murphy, Jr., deputy director; and Col. Seymour Shwiler, USAF (Ret.), technical consultant.

Senator SYMINGTON. The subcommittee will come to order. This is a classified hearing; kindly identify the people in the room.

General GILLER. On my left, Gen. Frank Camm; his number two man is Tom Clark, sitting on my right. Running the viewgraph machine will be Francis Murray, who works for General Camm.

Bob Duff, who works for me; Lew Groover, Programing and Budget, AEC, Jose Diaz; Assistant Controller Mel Greer; Congressional Liaison Officer Bob O'Neill.

From Sandia, Mr. Howard; and from Los Alamos, Mr. Agnew. They are all members of the Atomic Energy Commission or its contractors.

OPENING STATEMENT OF CHAIRMAN SYMINGTON

Senator SYMINGTON. Thank you, General.
I have an opening statement.

This is the beginning of what we hope will be an informative and constructive series of hearings on the military applications of nuclear technology. Some have heard me state previously, not until I became a member of the Joint Committee and traveled to Europe with Senator Pastore in the spring of 1971, did I realize the true military strength of the United States and became acquainted with the vast lethal power of our nuclear arsenal.

I actually learned more about the true strength of the U.S. forces in Europe in those 6 days than I had in some 18 years on the Armed Services Committee.

Congressman Hansen is here this morning. He remembers well that trip we took together, I am sure.

The trip and the facts obtained from it demonstrated the need for more knowledge in the Armed Services Committee with respect to manpower and weapons; and in the Foreign Relations Committee re our commitment to other nations, plus an understanding in both committees of the unprecedented force of the thousands of nuclear weapons we have, both at home and abroad.

We now have received data in this subcommittee which indicate nuclear strength currently of the magnitude that is almost incomprehensible. The United States has now deployed in foreign countries, on our ships, and in this country, some tens of thousands of nuclear weapons with a total maximum possible yield of over several billions tons of TNT—more than several hundred thousand times the yield of the bombs dropped on Hiroshima.

To put it another way, the total amount of bombs dropped on Europe and in the Far East during the entire World War II, excluding the two nuclear bombs dropped on Japan, was but 1/25th of 1 percent of the strength of our current nuclear stockpile.

One cannot help but consider the implications incident to our defense and foreign policies if these facts were known by the appropriate committees of the Congress, as well as in more general fashion by the American people.

With this in mind, I would hope we could make public all testimony taken today, and in future hearings, that would not aid a possible enemy.

In an effort to first gather the facts about this nuclear arsenal, we have asked General Giller, Assistant General Manager for National Security, to be our lead-off witness.

At a later date, we plan to call witnesses from the Departments of State and Defense, as well as other qualified persons, to testify on the various aspects of nuclear weapons.

General Giller, do you have a prepared statement?

General GILLER. No, sir. Because of the complexity of the amount of numbers involved in discussing our stockpile and its rationale, past, present, and future, I have prepared a number of viewgraphs and will use them in attempting to explain all of these facts.

With your permission, we will use viewgraphs without a prepared statement.

Senator SYMINGTON. Would you proceed?

General GILLER. Yes, sir.

STATEMENT OF MAJ. GEN. EDWARD B. GILLER, USAF, ASSISTANT GENERAL MANAGER FOR NATIONAL SECURITY, OFFICE OF GENERAL MANAGER; ACCOMPANIED BY MAJ. GEN. FRANK A. CAMM, USA, ASSISTANT GENERAL MANAGER FOR MILITARY APPLICATION, THOMAS R. CLARK, ASSISTANT DIRECTOR, DIVISION OF MILITARY APPLICATION, ATOMIC ENERGY COMMISSION; W. JACK HOWARD, VICE PRESIDENT, SANDIA CORP., ALBUQUERQUE, N. MEX.; AND DR. HAROLD AGNEW, DIRECTOR, UNIVERSITY OF CALIFORNIA LOS ALAMOS SCIENTIFIC LABORATORY, LOS ALAMOS, N. MEX.

General GILLER. My first viewgraph will give you an idea of the way in which the presentation is organized so that you can follow what parts will come when.

I am going through the worldwide inventory, all [deleted] of them, first taking the strategic systems. For my purpose, I define strategic as the Triad, the surface missiles, the ocean missiles, and the SAC bombers.

Other delivery systems will be included in the tactical or in the naval area and it is merely for ease of format rather than any particular other reason.

I propose at the end to go through these four deployment systems to summarize the total stockpile, summarize it in megatonnage, in trends over the years, in plutonium requirements and in a summary sense, tell you about how it all adds up and then, sort of shifting gears at that moment, we will tell you about the nuclear materials requirement, plutonium, uranium, and tritium and where they stand.

Then, we will discuss weapons effects and collateral damage, an important subject, probably more for the future than the past.

Toward the end, we will discuss physical security and command and control in the sense of hardware, primarily. I will be dealing with the nuclear weapons and their carriers, the weapons systems, the vehicles that deliver the weapon, whether it is a missile or aircraft or a man carrying an ADM.

We have prepared for you a small factbook, in which each of the systems I will be going through is illustrated together with some of the facts. I will be discussing each one of these.

The book may help you answer a question that I forgot to answer, which is not covered on my slide.

I would like to move on to the land-based missile systems.

I will tell you the characteristics of the system. Following that, I will then give you the number of warheads involved and some idea of their locations. The format will repeat itself.

In the land-based missile systems you see going from 1963 through 1970—the land-based force of the Titan II, Minuteman II, Minuteman III. It gives you the yields, the fact that the Minuteman III is the one MIRV system, and it shows you the CEP of the three systems.

From these facts, you see the range of the two Minutemen are about the same. The CEP's are roughly the same. Because they are MIRV's, the three Minuteman III warheads have less yield than a single Minuteman II.

Representative McCORMACK. Mr. Chairman?

There is a question on the yield of the Minuteman III. It shows [deleted].

General GILLER. Kilotons. That is a typographical error.

Representative McCORMACK. That is my only question. Thank you, Mr. Chairman.

General GILLER. We will go to the next chart, which will show you the stockpile level, that is the numbers.

You see, the Titan I has gone out of the stockpile by 1970. Titan II is sitting there at about 50 launchers. Whether or not it remains at 50 will be a decision based on the SALT agreements which allow us to replace the Titan with submarine based missiles if we so desire.

We just carry it in 1980 in this way.

Minuteman II, Minuteman III. This shows you the warhead. There are 450 Minuteman II and 550 Minuteman III missiles. Minuteman II's carry one warhead each. Minuteman III's carry three warheads per missile.

The numbers will not be exact multiples, due to the fact we over-build a small percentage for the purpose of stockpile testing later. These warheads are actually destroyed through the life of the system through nonnuclear testing. The warheads, therefore, on those three systems and the number of missiles on which the warheads sit are shown on the last line. That gives you an idea of what the land-based arm of the Triad is scheduled for now through 1980.

The next viewgraph shows you where they actually are located across the United States, through the central belt primarily. Vandenberg, of course, is a test site.

If there are no questions on the land-based missiles, I shall proceed to the submarines.

Senator SYMINGTON. Are there any questions?

General GILLER. The submarine-launched ballistic missiles appear on our next viewgraph showing between 1963 and 1978 the Polaris submarine, Poseidon submarine and Trident, with their appropriate missiles.

The range of the missiles shown here is the range for an average loading. One can always remove some of the multiple warheads and thereby increase range.

You can have flexibility in targeting to that extent. The CEP is shown going from the earlier systems of [deleted] down to about [deleted] nautical miles. The yield is shown there.

The Trident C-4 yield has not been decided by the Department of Defense. I think the decision is due shortly if they are going to make the IOC of 1978.

We show the standard MRV loading on Polaris A-3, the MIRV loading on C-3, Poseidon, of [deleted] and a MIRV loading of [deleted] on the C-4 in the Trident missile. These are the number of warheads/missile.

The total warheads that would go with this seaborne threat show the change in the stockpile from the Polaris A-1, A-2, shifting as time goes on toward the Poseidon C-3 and the Trident C-4, leaving still some Polaris submarines, the A-3 loaded submarine in our stockpile.

So, the total warhead number is several thousands.

Below is shown the number of tubes from which the warheads would be launched. The asterisk refers to the decision on what to do with the Titan II. The last line is to remind you that on the average half of the

submarines in general, perhaps a little more than that, are at sea in an operational launch configuration.

This number varies slightly, depending on overhaul schedule and in a time of crisis, that is a long buildup crisis, one might have a few more at sea.

One could postpone return for overhaul. There is some flexibility.

It shows you on the order of 65 percent as the maximum percentage of submarines you could have at sea.

The next viewgraph gives some of the rationale for the Trident submarine. It will replace 10 Polaris A-3 boats, that is the 10 that would be left which are not suitable for Poseidon conversion. The range increase of its missile would go from 2,500 miles to 4,000 miles. This C-4 missile would also fit into the Poseidon submarine and have the same performance. If they were to build a second generation missile for the Trident boat in the full tube diameter, they could probably get something like 6,500 miles. There may be more missiles per boat, 24 versus 16.

This is a quieter submarine, I am told, considerably quieter, which makes the Russian ASW problem more difficult, particularly with the added range.

I am anything but an expert on the rationale for our submarine-launched missile fleet. Admiral Rickover was here before your committee and he discussed this at some length. One of the points which I think is most important is shown in the next chart. One of the problems with upgrading of ASW—Russian ASW—is the searoom in which you have to operate, in which you can hide. Since the objective is to hide from the killer submarines the more searoom you have, by definition, I think, the harder it is to find. The present operating area shown in blue on the chart for the 2,000 nautical mile missile gives you 2 million square miles of ocean and that is roughly the range capability of the Poseidon C-3 missile.

The green area shows that with the Trident C-4 missile in either Poseidon or Trident, you triple the amount of searoom, and the ultimate would be the 6,500 nautical mile missile which gives you lots more ocean, 10 times the present Poseidon, in which to hide. That is one of the main reasons I think, for which the Navy and the Department of Defense are very much interested in going to the longer-range missiles. They can put the 4,000 nautical mile missile in either submarine, but they could not put the longer-range one in the Poseidon.

Representative HOSMER. Mr. Chairman, is there some advantage in being able to come at a target from additional directions?

General GILLER. The green area and the blue area certainly give you 360° coverage for approach angles into Russia which makes their ABM problem more difficult. Even if they were to upgrade the present ABM system, perhaps this would not be of such importance, but if the ABM Treaty were not to survive and they were to deploy full, ABM defenses, I think this would be most important.

Representative HOSMER. What about the PRC as a possible deterrent target of the future? With your present ranges, do you bring much of the PRC under surveillance?

General GILLER. Our map is centered on Moscow. If you wanted to cover both Moscow and China simultaneously, you would have to redo this chart to see how much coverage would be obtained.

Certainly, the present Poseidon would give you very little coverage of both of them simultaneously. You would have to go to the 4,000-mile missile or longer to cover both from the same operating area, although obviously, you could cover China with the present Poseidon if you wanted to station it in that part of the world.

Senator SYMINGTON. You are using 4,000 miles as the range for the ULMS missile?

General GILLER. Yes, sir.

Senator SYMINGTON. In some hearings I attended they gave 4,500 miles for the ULMS missile.

General GILLER. It probably depends on the number of "RV's". If you load [deleted] on the C-4 missile, it is my understanding it is the 4,000. If you off-load the range will be greater.

Senator SYMINGTON. You are saying the maximum range of the ULMS-1 in Poseidon is 4,000?

General GILLER. No, sir. That is with [deleted] individual reentry vehicles. If I were to load only [deleted] then it could get approximately 5,000 miles.

Senator SYMINGTON. When discussing range, I suggest you talk about the longer range.

General GILLER. Yes, sir. The range is variable, depending on its mix. Five thousand miles, I think, would be equivalent to the [deleted] RV configuration.

Senator SYMINGTON. You have 31 Poseidons; correct?

General GILLER. There will be 31 Poseidon submarines.

Senator SYMINGTON. Thirty-one times [deleted].

General GILLER. Thirty-one times 16 times [deleted].

Senator SYMINGTON. That could go 4,500 miles?

General GILLER. It would be 31 times 16 tubes times [deleted] total warheads.

Senator SYMINGTON. Which turns out to be how much?

General GILLER. [Deleted] of which half are on station at any given time.

Senator SYMINGTON. You have the ULMS missile at 4,500 miles. We have [deleted].

General GILLER. Half of them roughly on station at any given time.

Senator SYMINGTON. What is the tonnage of those missiles?

General GILLER. Each of the [deleted] RV's would be [deleted] kilotons.

Senator SYMINGTON. Thank you, sir.

General GILLER. To refresh your memory on the SALT agreement, we have shown here the United States and the Soviet Union agreement which shows 1,000 Minutemen—the 54 Titan II's we discussed earlier and the number of Polaris or Poseidon tubes of 656 for a total of 710, leaving the total launchers of 1,710 for the United States.

The Soviet Union, 209, of the older SS-7 and -8's, 313 of the large SS-9's, and the SS-11, their version of the Minuteman, would be 1,096. That totals 1,618.

Their submarine-launched missiles at 740—total permitted ceiling of 940—for a final total launcher ceiling of 2,358.

That is just to refresh your memory on something that is public knowledge.

I would propose to leave the sea-based missiles at this moment and go to the strategic bombers.

The next viewgraph will show you the B-52 and the FB-111 and to remind you that the KC-135 is a tanker required for the B-52 and FB-111. It gives you the combat radius; that is, the distance he can go out and then has to turn around and come back. Without refueling, for the B-52 aircraft it is approximately 4,000 miles and approximately 800 miles for the FB-111.

With refueling, we show an average radius of 5,000 miles on one refueling for B-52 and 3,000 miles for two refuelings for the FB-111. There are many bomb mixes available. The B-52 has two large bomb bays in which you can store a number of bombs or the SRAM rotary rack. The B-52 can also carry HOUNDDOGS or bombs externally. If you were to load the B-52 with the maximum number of bombs and SRAM's, you could haul 24 weapons. SAC does not do that because the aircraft drag goes up, range goes down, refuelings increase; that is, the performance of the aircraft decreases. Target structure is such that 24 probably exceeds the ability to go to 24 different targets.

So, they have a very complex mix in the fleet. For a complete picture you would have to ask the Commander of SAC to go through his whole rationale for how he loads his fleet against the targets.

A typical load might be four B61's and eight SRAM's internal in the rotary rack. You could also carry 12 SRAM's external.

Senator DOMINICK. What is the B61?

General GILLER. It is a bomb, sir. It has a maximum yield of a few hundred kilotons and three other yields. The viewgraph shows these yields at [deleted]. It is a weapon used by both SAC and TAC. It is on page 14 of your book which describes various weapons. It is the newest of all the bombs. It is capable of being carried externally [deleted]. At the moment there are [deleted] in the strategic stockpile.

You have either air or ground burst options which most bombs also have.

It shows the operational aircraft—we have 397 B-52's in 1973, going to [deleted] in 1980. The FB-111s are scheduled to go from 66 in 1973 to [deleted] in 1980. The tanker fleet remains at 615 over this period. About 150 of these B-52s are on 15-minute alert. These are end of the runway alerts. SAC says they can do much better than the 15 minutes.

In fact, some of them will be gone in 3 minutes, they claim.

I remind you, as I said, there is quite a mix of bombs available to the strategic aircraft fleet. This shows four of the present ones, the B28, the B43, the B53, and the B61 bombs. They have been coming into the stockpile over the last 10 years. They have a number of yield options. Shown below on the chart are the fuzing options, you see the first three must be selected on the ground by the ground maintenance personnel. The B61 has as one of its features in-flight fuzing selection by merely turning a dial. They load these aircraft out in various mixes, depending on the range, target structure, expected enemy reaction. It is a complex targeting arrangement which SAC is most qualified to give you.

The numbers of such bombs that we were planning to have, going from 1961 through 1980, are shown in the next chart. The item

"other bombs" means in 1961, we had a lot of older bombs still in stockpile which have subsequently been retired.

The total number of bombs available to the strategic force goes down a little between 1961 to 1980.

The bomber force is capable of carrying more than the several thousand bombs shown as far as physically attaching them to the aircraft. This is a mix which SAC feels most appropriate for their particular mission.

Senator SYMINGTON. Mr. Bauser says you have a B41, also.

General GILLER. They are the [deleted] "other bombs" shown on the chart. These are large-yield ones called the B41 at [deleted]. They are leftovers from the days of the very large weapon designs. They are in the contingency stockpile. It is listed among the "other bombs". There were so many older weapon designations that in order to reduce the data on the viewgraph, I tried to condense it.

The strategic aircraft may also carry two types of missiles, the HOUNDDOG and the SRAM. The HOUNDDOG is 15 years old. The SRAM is just going into the stockpile. The HOUNDDOG has a turbojet engine device and a [deleted].

The SRAM is a ballistic missile. It is a true missile, it burns a chemical propellant. It has a yield of [deleted]. It is maneuverable.

These are stand-off weapons, long-range attack weapons. They are used primarily for defense suppression, which means they are using them to penetrate by breaking up the air defense control centers.

I am sure you are all aware that Russia has a fantastic air defense system made up of aircraft and missiles in several versions.

They have invested a much greater effort than the U.S. and they exercise to keep their air defenses sharp. On the other hand, the Russian bomber fleet against the U.S. is much smaller and seems to be much less credible in our eyes than the U.S. bomber fleet is to the Russians.

The warhead stockpile level for the HOUNDDOG and SRAM is shown below. The HOUNDDOG is shown at [deleted] in 1961 and [deleted] in 1980. The number of SRAM's is increasing, manufacture is under way now. A total of [deleted] SRAM's will be in the fleet by 1980 making a total of [deleted] for both missiles.

The SRAM's are carried in a rotary rack—eight of them. As the bottom missile comes out, it is fired. The HOUNDDOG is carried externally and is an air-breathing missile.

By this time, I had intended to give you all the numbers associated with the strategic fleet, the strategic triad, as defined. I would propose to move on to the tactical systems, with the chairman's permission.

Senator SYMINGTON. Before you do that, General, may I commend you for a superb presentation. It is so much easier to follow when you do the job, as you have, with these pictures. The Chinese say a picture is worth a thousand words.

Is there any difference between the HOUNDDOG and the SRAM from the standpoint of the speed of the missile?

General GILLER. Yes, sir.

The HOUNDDOG is a turbo engine, it is really a small airplane. Its maximum speed is Mach 2. The SRAM is also supersonic at maximum speed of Mach 4. If flown on the deck at [deleted] it has a range of [deleted]. If flown in a ballistic trajectory, it has a maximum

range of [deleted]. It is a much more versatile one than the HOUND-DOG. You can shoot the SRAM sideways and forwards.

You can even shoot it backwards. It has a very good CEP.

Senator SYMINGTON. You remember the SKYBOLT was going to take the place of the HOUND-DOG. Unfortunately, it was cancelled in a previous administration, which I always thought was a mistake. In any case, the SRAM is a substitute, you might say, in speed for the HOUND-DOG, although it does not have the range of the SKYBOLT?

General GILLER. It certainly has a defense penetration speed, yes, sir. The SKYBOLT was conceived primarily as a strategic attack stand-off weapon. The SRAM is targeted primarily for penetration so that the bomber can drop some of the larger bombs.

As I say, SAC has a very complex combination of using all of these bombs and these two warheads, against a target structure.

To any general statement I make, there are obviously a number of exceptions.

I would propose to move on to the tactical section. This is a little harder to organize and to keep the parts clear in one's mind.

We have organized it by starting with the tactical surface-to-surface missiles. There are four of them now. Before 1958, there were a number of others which have since gone out of the stockpile. Coming into stockpile over the last 15 years, we show several missiles whose ranges begin with the short-range Honest John at 40 kilometers and extend to the Pershing which has up to 400 nautical miles—725 kilometers.

I am sorry, that chart is not internally consistent in distance. The Honest John is a free unguided rocket, therefore, the CEP is much larger. It has three yields in three separate warheads.

The Sergeant is a missile which is mounted on the launcher at the firing site. In order to utilize its two yields, you must interchange warheads on the missile. The Pershing, which some of you have seen, is road-mobile. It is a bigger machine. It has three yields which are interchangeable. On the other hand, the Lance missile has [deleted]. It is usually transported on a launcher which looks like a tracked personnel carrier with a large missile sitting on it. It has three yields, [deleted]. The Army considers that to be a very fine weapon and our NATO allies are seriously considering purchasing some of the Lance missiles, to replace the Honest John and the Sergeant.

This replaces quite a number of older systems as given on your chart. Page 11 shows you some of the warhead numbers. Lance replaces several thousand Honest John and Sergeant warheads.

The numbers of warheads which are stockpiled appear in this view-graph. It shows the number of Honest John going down by 1980. There will be some left with our allies.

Sergeant will drop to zero. The Pershing will stay at its present level. Lance comes up to about [deleted] in 1980. The item "other" accounts for the fact that there were other missiles which have been phased out since 1961. The total surface-to-surface missile warheads available to the United States and our allies will have gone from [deleted].

We might look at some of the characteristics of the newest missiles. Lance is mobile, it has its own launcher. You can load it at the

fire-site. The Lance is self-propelled and has its own missile on the launcher. It has a [deleted]. It has a very versatile range of 5 to 125 kilometers. They provide [deleted] missiles per launcher on the average. Some launchers may have more or less, depending on the specific targeting, the specific front and the section in which they are located.

Representative HOSMER. Do they have an auxiliary vehicle of some kind?

General GILLER. Yes, sir. They have an auxiliary transporter loader. Therefore, they have flexibility. They are tracked carriers.

Honest John and Sergeant, which Lance replaces, are much slower to fire and the yields are [deleted]. They are older systems, clumsier, operationally more difficult to handle. I believe there is a fair savings in personnel, in the total replacement of Honest John and Sergeant with Lance.

I propose to leave the land-based missiles and go on to the nuclear artillery shells.

There are two types in the stockpile at the present time. There are two replacements under active engineering development by the AEC. The 155mm, for instance, the present one is about 10 years old. We propose to have a new one within the next few years. You can see the range is almost double. The old one has very small yield and the new one has two yields. That gives it more flexibility.

I shall give some more rationale on these in a moment.

Senator SYMINGTON. Before you leave this, the staff says the cost is high. What is the cost of the 155 millimeter—the total estimated cost of developing this shell?

General GILLER. The shells for the amount of nuclear yield, per kiloton, are more expensive because they are relatively small in diameter, meaning it is very difficult from a scientific standpoint to get an efficient nuclear burn.

Therefore, it uses more fissionable material than a larger diameter device.

Senator SYMINGTON. I understand it is close to a billion dollars for these relatively few shells.

General GILLER. The total estimated cost for the desired number of 155-millimeter shells would be about \$900 million, which includes \$375 million for the nuclear material and a large amount of allocated fixed operating cost. Of course, much of that nuclear material will be recovered from the retirement of the old shells, and its value should be deducted from the total cost. Actually, although the cost estimate you have is based on production of the number desired, we have agreed with DOD only on a requirement for half that amount of 155-millimeter shells as a [deleted] replacement for those now in the stockpile. We estimate the true out-of-pocket cost for doing that—the incremental production and 10-year stockpile support cost, plus the investment in capital facilities for production—to be \$54 million. To that you should add the value of additional nuclear material required. That's worth about \$24 million.

Representative HOLIFIELD. Why do we persist in this type of obsolete weapon? I felt, since it was initiated, that this was just an attempt on the part of the artillery people, the Army people, to get into the nuclear act. I have never been able to understand the reasoning of how you take such an expensive weapon with such limited mobility

and with such contaminating qualities to it, cluttering up your area within a very short range of where you are.

I just cannot understand this. I have never been able to understand it. I think it ought to be abolished, the whole system.

General GILLER. It certainly has been a controversial item. The Army, especially, will defend it.

Representative HOLIFIELD. What are we doing in [deleted] and [deleted] with these weapons?

General GILLER. The weapons in [deleted] are in storage only. However, they provide the same fundamental purpose in [deleted], I believe, as they do in Europe. Because of the large number of artillery tubes, any one of which can have nuclear artillery shells and are available across the front, we feel that the uncertainty in the enemy's mind considerably deters him from two sorts of things:

One, starting a war, because the first artillery he may engage might have a nuclear capability.

Secondly, if he ever masses his troops or tanks for a breakthrough, they become extremely vulnerable to this rapid response weapon.

Certainly, the missile systems have a similar role to play, but it is felt that the forward artillery, with its rapid response, fast targeting within a few minutes, adds a very great deterrent to tactical maneuvers as well as to the general deterrent of starting this war.

I happen to believe personally that an uncertainty in the enemy planner's mind that we might respond with our nuclear artillery or other nuclear weapons, creates an uncertainty as to how the war will go, which, I think, makes him more deterred, because he cannot control the course of events.

Senator BAKER. Mr. Chairman, may I ask a question in this respect?

Senator SYMINGTON. Senator Baker.

Senator BAKER. General, can you tell me what comparable weaponry the Soviet Union has?

General GILLER. For a good briefing on that, I suggest you have Intelligence do it. I don't have too much on that. They do have something similar to our surface-to-surface missiles, which are mounted on track vehicles—

Senator SYMINGTON. Excuse me, General. That was not the Senator's question.

Senator BAKER. I am asking about an artillery shell.

General GILLER. [Deleted.]

Representative HOSMER. What weapon do they have to accomplish the same mission as your artillery shells?

General GILLER. From the Soviet doctrine and from our Intelligence, they appear to use bigger, larger yield, longer range missiles. There appears to be an asymmetry between the United States and the U.S.S.R. in this respect.

Representative HOLIFIELD. The old one was 9 miles in range; the new one is about 20, is that right?

General GILLER. Yes, sir. Fourteen to twenty-five kilometers in the case of the 155-millimeter—about 18 miles.

Representative HOLIFIELD. I think it is a dangerous thing to have this type of opportunity for provocation to start a full-scale nuclear war. I think that goes for the demolition bombs, too. [Deleted.] It seems to me that we are really playing chocolate soldier on some of these things.

General GILLER. The ADM is certainly plagued by that problem. Representative HOLIFIELD. It is nullified by a problem. [Deleted.]

General GILLER. What happens to the ADM is an emotional problem, apparently, [deleted].

We will discuss shortly some technology which we feel increases the military usefulness of ADM's without, perhaps, [deleted].

Sandia has investigated, rather completely [deleted].

Senator BAKER. Can you tell me the number of ADM's and what they cost?

General GILLER. The number of ADM's is a total of [deleted].

Representative HOLIFIELD. That is on page 16 of your book.

Senator AIKEN. Do I understand correctly what the general has been trying to tell us is that the enemy won't know with what the gun is loaded and, therefore, they know the shell will serve a useful purpose in [deleted] and elsewhere?

General GILLER. I am not sure I understood your question, sir.

Senator AIKEN. The enemy won't know with what the gun is loaded; the enemy won't know but what they are late model shells, more destructive ones than the ones that are actually in place there? Is that it?

General GILLER. The answer is yes, sir. They will not know whether we have an old one or new one. I think the rationale for replacing the weapon is not based on their knowing you have an old or new sword available, but rather, on the operational usefulness, the warfighting capability if you ever have to use it.

Now, the purpose is deterrence. If you have to use these weapons the Army feels that the new ones provide them with considerable flexibility that they don't have now. This other chart which I will show you is what we think the advantages are. In the 155mm shell, we talked about the increased range. [Deleted]. In the case of the 155mm, it has the [deleted] yield, which is larger than the old one, for use on appropriate targets. [Deleted].

Improved custodial control options have been included which provide additional protection against overrun. [Deleted].

For the artillery folks, it is ballistically matched, which means it goes the same path as the standard round. They don't have to re-sight the gun, something they don't like to do.

The Army considers this would be one of the advantages of the new shell, independent of whether the Chinese or Russians think we have old ones or new ones.

Senator SYMINGTON. I would associate myself with the remarks of Congressman Holifield. We were into this 20 years ago, when we were trying to develop an atomic cannon. It costs a billion dollars—consider cost-effectiveness—to get it started, and does not come into the inventory for some years.

Representative HOSMER. Dr. Agnew was scientific advisor to NATO at the time some of these artillery and ADM ideas came up.

I wonder if it would be proper to have him comment on the question raised by Mr. Holifield.

Senator SYMINGTON. We will have Dr. Agnew up. What we want to do now is get the military aspect. Later on, we will get the scientific aspect.

Representative HOSMER. I wonder if General Giller would comment on the matter which has just been brought up by Mr. Holifield.

General GILLER. With your permission, I would like to ask General Camm to respond. He is a former member of the systems analysis group which studied the shell considerably.

He is member of the Army, also. I think he is quite competent in that area. I would like to ask General Camm to say a word.

Senator SYMINGTON. General Camm.

General CAMM. You remarked that it would take several years to get the atomic cannon into the inventory. Actually, this would be the second generation shell coming in. They have had one for nearly 20 years. I think the essential question about the nuclear artillery shell has to do with the question of whether or not tactical nuclear war is a feasible option. There are some people who think once it goes nuclear, it is going to go strategic and there is no in-between thing. There are other people who think it would be better to have some in-between option.

There is a widespread view that strategic nuclear weapons are at a stalemate. If we get into a fight in Europe, the question is, how should we fight that war. At what point do you go to the strategic level, knocking each other's cities out and how long do you stay at the tactical level, on the ground in Europe?

If you are going to fight it on the ground, the question is can we fight it conventionally without using nuclear weapons.

Considering the large number of Warsaw Pact forces, which in tanks seem to outnumber us more than 2 to 1, there are many people who feel we will not be able to handle them conventionally, which means we will have to go to nuclear weapons. [Deleted].

If we do, the nuclear projectile is a very real part of that and actually, if it is used, it is able to handle the enemy with far less damage to the civilian populace in which we are fighting than with larger yield weapons.

As you notice the yields of the nuclear projectile are very much smaller than the bombs or missiles that we are using at longer ranges. Therefore, we are much less likely to inflict serious damage in the area we are fighting in than if we use larger yield weapons. Those are the arguments that are used for employing these weapons if you need them.

Senator DOMINICK. If they are going to shoot them off 8 miles away, how are you going to advance?

General CAMM. You don't leave radiation on the ground. You burst them in the air. The blast and radiation damage the target you are hitting. Then, you can move right through that area immediately because they are airbursts.

The artillery shells will go off in the air and create damage. You can go through it. Airburst minimizes any residual effects that might remain on the ground.

Representative McCORMACK. There was a comment a moment ago about an atomic cannon. I would like to know if we are still talking about any special weapons other than the ordinary 155-millimeter gun.

General CAMM. No, sir, just the two conventional artillery cannon which will fire these atomic shells.

Representative HOLIFIELD. How much does the cannon weigh?

General CAMM. I don't know the exact weight, sir. The towed version of the 155-millimeter cannon can be carried by helicopter. So, it is not very heavy.

Representative HOLIFIELD. They tried to get them over the roads and broke the bridges down in Europe, turned over turning corners.

General CAMM. That was the large 280-millimeter cannon that we built, the first one that we had a nuclear shell for. The ones we have now are smaller than that. The cannon doesn't weight any more than tanks do. We can move them wherever you can move tanks if they are self-propelled and they are much lighter if they are towed.

Representative HOLIFIELD. As far as the yield is concerned, you have small yields in the Walleye, for instance [deleted]. Your artillery shell goes up to [deleted]. The Walleye is delivered by air.

General CAMM. That is correct. The Walleye is a similar precision-type weapon. We have relatively few of them. Those are the sort of weapons, the Walleye is a good example, that we could use if it is decided to employ nuclear weapons in a tactical war. You get precision accuracy, small yield, small collateral civilian effects.

Representative HOLIFIELD. It would seem to me to make more sense than this which is limited in range and very expensive in its construction.

General CAMM. One point about this has to do with the reaction time. The artillery which is right with your ground forces which you want to protect can respond in a matter of a few minutes.

If we can put chart 5 on, I would like to show you just a pictorial example. This is a tank column here, threatening your friendly troops which are here.

[Deleted]. The new artillery shell has a much faster response time. The tank column could only come over here and you could knock them out before they get to you. You do want to have some rapid capability—and the Walleye takes a few hours because of the command-and-control problem of getting the information where the target is back to the air control centers and sending out the aircraft to go out and attack. You want a weapon with your ground forces that they can use quickly to react against a target that threatens to overrun them.

Senator SYMINGTON. General, will you proceed?

General GILLER. Yes, sir.

The number of artillery shells which are proposed for stockpile are shown on the next chart. It shows the 155 millimeter, essentially a [deleted] replacement, between now and the end of the decade.

In the case of the 8-inch, it shows a slight increase of about [deleted] more for a total of about [deleted] of both types which is essentially what we have now.

So both of these are essentially a [deleted] replacement as far as the stockpile is concerned, between now and the end of the decade.

Our next viewgraph gives you some idea of the number of shells and tubes available, in this case in Europe. Three are [deleted] 155-millimeter nuclear shells over there. There are 360 U.S. tubes. There are also 324 NATO tubes which are capable of firing [deleted].

In the case of the 8-inch, [deleted]. There are [deleted] shells in Europe, and 326 tubes, both NATO and United States, available for firing. That gives you an idea of the number of rounds per tube.

The tubes are spread across Western Europe from the North to the South. The rounds are kept in the proper depots.

Representative HOLIFIELD. You say you have no political agreement to use them?

General GILLER. [Deleted.]

Representative HOSMER. They can be used by U.S. troops?

General GILLER. Yes, sir. That is a political agreement between the countries concerned.

Representative McCORMACK. General, do I understand that part of your 8 inch will be [deleted]?

General GILLER. [Deleted.]

Representative McCORMACK. About half and half?

General GILLER. No, sir. When they are replaced, they will all be [deleted].

Representative McCORMACK. May I see the previous slide? I see a 1980, 8 inch, the old W33.

General GILLER. We picked the year 1980 for the cutoff. It is intended to keep going until finally all old ones are replaced by new. It just happens to be a manufacturing rate at that point, sir.

Representative McCORMACK. Thank you.

General GILLER. You have already seen and have had discussion of the 155-millimeter shell. In the case of the 8-inch shell there are one or two additional items. We have thousands of kilograms of highly enriched uranium in the old shell which is worth on the order of a billion dollars. This will be returned to the U.S. stockpile [deleted].

We don't get that large number of dollars for free, of course. We have to pay an additional \$250 million including all the nuclear material to develop and produce a total replacement, so there is a major economic advantage. Again, the 8-inch will also have improved custodial control options which provide additional protection. In my view, this goes a long way toward answering the worries about overrunning.

I was proposing to leave the artillery now and go to the tactical bombs and airplanes. First, we will discuss the tactical bombs that are available. There are a number of models of aircraft which are capable of carrying these bombs; approximately 17 or 20. Rather than trying to list all airplanes and all bomb combinations which would fill the record with a lot of numbers, I have shown you five bombs that are currently available and will remain in the stockpile for some time over the next few years, at least.

The stockpile has quite a range in yield, starting at [deleted] and going to [deleted] between the B-28 and the W-72. The W-72 is the optical-guided Walleye. Obviously, the weight of these bombs varies. The Walleye system is fairly heavy—1,125 pounds. These five bombs all have air or surface burst. The modern B-61 is capable of high-speed delivery [deleted].

The Walleye is a special-purpose, TV-guided bomb. You must be able to see and identify the target. The pilot puts the cross hairs on the target which is presented on a television-like tube and launches within appropriate range. From then on it goes to the target unaided.

They remind me Walleye is not a rocket, but a glide bomb.

Senator SYMINGTON. General, I would ask a question here that will certainly come up in due course. You call it a tactical nuclear bomb. The Hiroshima bomb was actually only 14 kilotons—14,000 tons—according to Dr. Agnew, whom I visited and had a very pleasant time with at Los Alamos.

You say this weapon is a tactical bomb despite it having a few hundred kilotons.

That is many, many times the Hiroshima 14. As I understand it, our forward-based aircraft can carry two of these—actually more than that. They could carry two with extra gas tanks. Isn't the word "tactical" a little misleading. They would be performing a strategic mission if they destroyed a city.

At the end of World War II, when our P-51's took off from Iwo Jima, they could barely get to the southern coast of Japan. When they got there, if they knocked out a Japanese plant, they were performing a strategic mission. But in the Battle of the Bulge, we took the biggest bombers in Europe to support the troops in an effort to contain the Germans. Obviously that was a tactical mission, despite the use of a strategic bomber.

I don't understand why this is a tactical nuclear bomb if it has a capacity far exceeding the Hiroshima bomb [deleted] times as big and can reach Soviet targets.

General GILLER. Yes, sir; you certainly have described the situation.

Senator SYMINGTON. I can remember being in Turkey back in 1959 where the commanding officer said, "Every one of my pilots has a town in his mind he knows from the air better than you know your own hometown on the ground."

Those weapons were no doubt more powerful than Hiroshima, but nothing like the bomb in question. So I don't quite understand why it is always classified "tactical."

Will you comment?

General GILLER. Certainly.

As you say, the target system describes the purpose of the bomb perhaps better than the yield. I think it is the jargon of the trade, perhaps, that those bombs that are targeted through SAC and which are in the Triad are normally called strategic bombs whereas, those that are assigned, with fighter-bombers, are normally called tactical bombs.

Quite a few of these delivery systems and bombs are capable of being employed in either tactical or strategic roles. [Deleted]. The Russians as I understand it define strategic as anything that can strike the homeland. Therefore, their argument is any system which can strike Russia is strategic and should be counted in with the ICBM's.

On the other hand, IRBM's and MRBM's pointed at NATO are not strategic. At this point, I think I find it rather confusing. I think it is confused in people's minds, one versus the other. When we are in NATO, part of NATO, we should look at the IRBM's as strategic, also.

Senator SYMINGTON. Dr. Kissinger, when on public television in Moscow, was asked "How do you justify our 1,064 against their 1,618 ICBM launchers?" we getting the lesser figure; and "How do you justify 710 against 950 in submarine launching tubes?"

He replied, "You must not forget our strategic bombers and our forward-based aircraft." We can't have it both ways, as I see it.

Obviously, this is going to be a matter of serious discussion in any future SALT talks.

General GILLER. The same airplane is capable of taking that same bomb and [deleted] and going after a railyard 100 miles away. How we are going to solve that problem in SALT, I don't know.

Representative HOSMER. You are talking specifically—you are answering questions relative to the B-61 bomb?

General GILLER. The high-yield version.

Representative HOSMER. It has [deleted]. Is that correct?

General GILLER. Yes, sir.

Representative HOSMER. Are those yields [deleted]?

General GILLER. Yes.

Representative HOSMER. If the [deleted] the employment would be in a tactical mode. If [deleted] you would be in a strategic mode if you were in a strategic war; is that correct?

General GILLER. The answer is yes and no. The way you described it, it would be yes. All I can do is comment on the fact that I could find it inconceivable of expending several hundred kilotons on a rail yard. Whether that is strategic or tactical, I think, depends on how you view it.

Representative HOSMER. The end use to which it is put is the definition of the weapon?

General GILLER. Yes, sir.

Representative HOSMER. This is a dual-purpose weapon. You can use it for strategic purposes or tactical.

General GILLER. Actually, the B-61's in SAC are in the B-52's and are primarily used against strategic targets.

Senator SYMINGTON. We have quite a choice, you might say, because the total amount of bombs dropped on Germany and the Far East during all of World War II was just over 2 million tons. In our warheads now we have several billions tons. So we can decide how to describe them and probably be right in every case.

General GILLER. Certainly in that context; yes, sir.

The next viewgraph shows you the numbers, the stockpile levels of tactical bombs that we have described before. The number goes up slightly over a 20-year period, from [deleted]. You can see the B-28 is going out. The B-61 is [deleted] the B-57 [deleted]. The B-43 [deleted].

We will talk about retirement shortly, but I remind you when I say "go out" or retire, they will be returned from the operational inventory, torn apart, all the fissionable material recycled and anything else we can use.

At that moment, it is back in the stockpile of fissionable material essentially.

The other, the [deleted] refers to older weapons which were just going out of stockpile in 1961. We picked the year 1961 and that is the accurate number.

I will go from aircraft carried bombs now to one we have discussed a little bit already, the atomic demolition munitions.

There is a small one and medium yield one. One of them has a larger yield of [deleted]. The crater sizes are given. One is portable by man and one by vehicle. These are used for the purpose of creating barriers to channel high-speed attacks and block passes in mountainous areas. This is an attempt to force concentration of targets at the barriers created by the ADM. It is really a target manipulation device.

Senator DOMINICK. I don't understand what you are saying, General.

General GILLER. For example, I understand, there is a very popular route for troops running back and forth in Europe through history. By using demolitions and cratering so that tanks and armored vehicles and people cannot use all of the valley but by forcing them into various pockets, and making them channel their traffic, by slowing them up, you can create targets of sufficient size worthy, perhaps, of another nuclear weapon or conventional air strike.

Whereas, if you didn't, they could make more use of the gap to attack rapidly and remain sufficiently dispersed.

Senator DOMINICK. You do not fire these?

General GILLER. No, sir. That is what Congressman Holifield is referring to. In order to use one, you must get out there, dig a hole in the ground, or have it prechambered, drop it in the hole and run back and fire it. You are making craters ahead of their troops. Under the current political and technical constraints you might set out 10 teams to crater a valley, only 5 of them might ever get there. Therefore, the certainty as to whether you get all teams in place is not too high. If the holes are already dug, obviously you drop it in and fire it by wire or by radio. New technology in the fuzing and firing, nuclear component design, and the application of sensors could permit us to overcome both the technical and political constraints.

General CAMM has looked at this, too. He would like to say a word.

General CAMM. I think a more understandable parallel is the use of demolitions to blow up bridges in front of the enemy. The ADM's are used to blow up modern concrete bridges which are harder to blow up than the bridges in World War II. In World War II, when the Germans failed to destroy the Remagen Bridge across the Rhine River, we were able to get a division across there very quickly and get their Rhine defenses. If they had an ADM, as we have here, they could have blown that bridge and kept us from getting across. The ADM's are useful not only in terms of making craters in the ground to block tanks and other high-speed vehicles, but to blow bridges across the main rivers.

Senator DOMINICK. You would, again, have to have them emplaced on the bridges.

General CAMM. No. All you have to do is have them in the trailer of a jeep. The jeep drives up on the bridge. They set the timer and drive off. It goes off and it blows the bridge down. You don't have to have it preplaced and you can do it in a relatively few minutes. You will do it with far less collateral damage than if you fire artillery shells or drop conventional bombs. It is so much more accurate when you place it yourself.

You can use a smaller yield to do the job.

Senator BAKER. I am going to have to leave, Mr. Chairman, to go to another meeting at 11:30. It is difficult for me to place these several weapon systems in perspective unless I have an overview of the scenario that is likely to follow on in the event of hostilities.

While that is not, strictly speaking, within the jurisdiction and purview of this committee, it seems to me it would be very helpful if someone from DOD could give us the several scenarios that might occur if there was, in fact, an incursion by Pact troops in Europe, if we did use atomic artillery shells, if we, in fact, could use ADM's and what the likely counterthrust would be.

I am sure it is not appropriate to ask these witnesses, but I would like to ask if, in the course of these hearings, we might have some sort

of information given us to complete the record on the probable way that such hostilities might develop.

Senator SYMINGTON. I much appreciate what the Senator from Tennessee says. As a member of the Armed Services Committee for over 20 years—and Senator Dominick has been on that committee for many years—it is a lack of coordination in such matters that is unfortunate. I am certain in my own mind it has cost the American taxpayer a very great amount of money. Senator Pastore told me that in some of these countries where we have atomic demolition units the host countries will not allow us to dig the necessary holes to put them in; is that correct?

General GILLER. It is my understanding that the authorities in some areas have been reluctant to permit publicly digging holes for the purpose of prechambering for nuclear weapons. However, they have dug holes for prechambering of high explosive, a point which I find rather contradictory since that hole can be used for either charge. [Deleted]

Senator SYMINGTON. Don't they have to be deeper for a nuclear explosion?

General GILLER. The crater would be more efficient if it were deeper, but "HE" depth makes quite a good crater.

Senator SYMINGTON. They say, "You can dig a hole provided you promise not to put a nuclear weapon in it?"

General GILLER. I am not sure how that conversation goes. If General Goodpaster should come before you, I am sure he could clarify this situation.

Senator BAKER. If we could have, at some point, someone from the strategic planning responsibility of DOD give us some sort of scenario and how we are likely to be called on to use these weapons—

Senator SYMINGTON. I asked Captain Bauser this morning—he said he didn't know—is there any rule in the Joint Committee that would prevent a member of the staff of the Armed Services Committee sitting in on these hearings?

Representative HOLIFIELD. I don't know.

Senator SYMINGTON. Captain Bauser thought I meant a Member of Congress. I think we have some very fine Members of Congress here. Following Senator Baker's thought, you have to have a lot of staff work if you are really going to accomplish anything.

Representative HOLIFIELD. I think in the past the members of this committee—and I would like to be corrected by either the staff or by Mr. Hosmer here, who has been on the committee longer than anyone else—have never tried to become military planning experts, strategic, tactical, or any other kind of experts.

The way the Atomic Energy Act was written was that the Defense Department, working with the President, asked for a certain number of weapons of certain kinds and the facilities to manufacture them. The members of the Joint Committee have never tried becoming war strategists, war planners. We more or less considered that was the job of the Armed Services Committee if they wanted to go into that part.

Our function has really been to develop in our laboratories weapons asked for by the military and directed by the President and we have never applied ourselves to war planning and war gaming and setting ourselves up as Chief of Staff to exercise judgment over how a war should be fought.

Senator SYMINGTON. If the Congressman will yield, I thought his questions this morning had more to do with good common sense than it did with war planning, when he asked questions about the functioning of the 155-millimeter shell.

I brought up this question about a member of the Armed Services committee staff who helps me in Armed Services and appropriation work on military matters.

I raise the question again. Mr. Braswell,¹ one of the most informed men in town on military matters, is the head of the staff of the Armed Services Committee. If he could be allowed to sit with the eight or nine gentlemen from the Atomic Energy Commission back there and get the benefit of some coordination, I think that especially important because it is my understanding from appropriations hearings that the military simply tells the Atomic Energy Commission what it needs, then the Atomic Energy Commission builds those needs and pays for them.

When you can get something for nothing, one generally buys more than if it had to come out of one's own budget.

Senator BAKER. Before the committee directs itself to the query the chairman made about another staff member, let me add one word in response to the remarks Mr. Holifield made. I have no desire to turn us into a war gaming, war planning committee, nor an Armed Services Committee.

The preamble to my remark was that I find it difficult to evaluate the usefulness and desirability of these several weapons systems unless I have some idea how they might be used under varying circumstances.

What I was asking was if we could have not special detailed account of our contingency plans, but whether an overview of how these weapons are useful or not useful and what the likely Russian response would be if we used them and under what circumstances.

Representative HOLIFIELD. I have no objection to such a briefing and such increase in knowledge of our members.

The only thing I said was that over the years of existence of this committee we have not gone into the strategy of the use of weapons. The laboratories and the Sandia Laboratories were responsive. We have been a conduit, in a way, for funds going into a part of the Atomic Energy function which was put in there by law but which we were not charged with the responsibility of sitting in judgment on.

The President has always taken that responsibility. Back in the early days, the Vandenberg amendment, there was an attempt to solve a problem at that time of conflict between the Armed Services Committee and the Joint Committee and it was done by the appointment of a military liaison committee who would acquaint us with the facts.

Some of these things don't make sense to me. They never have made sense to me. I did not feel it was my responsibility to sit in judgment on them. Maybe I am wrong. Maybe all of us are wrong.

Senator SYMINGTON. What we are talking about now primarily is the problem of an increasing scarcity of money the taxpayers are putting up for all reasons.

The able Congressman brought up the fact that this shell was questionable, it was costing a billion dollars. Senator Baker's idea is to

¹ T. Edward Braswell, Jr., Chief Counsel and Staff Director, Armed Services Committee, U.S. Senate.

coordinate the function because if there is no hold on the military they will ask for everything, especially if they don't have to pay for it.

Representative HOLIFIELD. It all comes from the Government. I have no responsibility for the expenditure of it. I might ask the question, has the Armed Services Committee of both Houses, have they gone into this matter of the judgment as to what the war games and what the war plans were? Have they gone into that? They are the ones that have custody of the weapons. They are the ones that ask for the weapons. They are the ones that have to use the weapons. Has the Armed Services Committee done this?

Senator DOMINICK. We have done quite a lot of this on separate weapons systems. Some we have cut out and some we haven't. The big danger I see if we get into that here is that we get into contingency planning.

If we once get into contingency planning in this committee, we are really playing with fire.

I think it would be a very bad mistake for us. We have avoided this in the Armed Services Committee and I would hope we would do it here.

Every contingency that every mind of man can conceive of, I am sure, has been analyzed and suggested as to what we should not do. If there was ever any leak anywhere, you have a whole fear psychosis which would be built up in this country and around the world which would be a terrible mistake.

Representative HOSMER. I think, perhaps, some historical perspective might be in order here. When this committee was formed in 1946, it came out of largely the Armed Services Committee of that day. The membership was largely duplicative, not completely, but largely. They just sawed off one of the military services committees.

In the early history of the committee, the input into the military committees enabled this committee to always be in a position where most of its members were knowledgeable people with regard to strategy. With the fact that the hardware we were dealing with was going to be employed over the years with a lesser emphasis on military and greater emphasis on the civilian aspects of nuclear energy, our membership is no longer duplicative.

I suppose we are in a position now, unless one practices very hard and unless he is a very attentive member of the Armed Services Committee of the House or Senate, to see the relation between providing the hardware and the strategic uses.

We have used the device of the Joint Committee hearings. We did that with the test ban in the Atomic Energy Committee, Foreign Affairs Committee, and Armed Services Committee.

I would suggest that where you do wish to solve this problem of instances where the need to know extends past more than one committee, we resort, as we have in the past, to regular joint sessions. In that case, the staff of both committees are properly in attendance and so on.

Senator SYMINGTON. That is an interesting thought. I happen to have known Brien McMahon personally. We talked about this new force a great deal. I remember that the military budget request in 1949 or 1950 for the total services was \$13.8 billion. Today, it is \$80 billion-plus. We have a different problem.

With all due respect to the historical past, which I respect, of course, it would seem that things have gotten to a point now where we have to face realities. I would take up the questioning of the 155-millimeter shell by the able Congressman from California, some \$1 billion for this shell. Senator Baker thinks there should be some discussion. I would like to see more analysis of what we do or don't do in this nuclear field as we do in other fields.

Senator BAKER. I hope I did not create a tempest in a teapot. I want the record to clearly show that I am not trying to turn us into a military strategy party. I am not trying to impinge on the responsibility of the Armed Services and Armed Forces Committees.

What I do want to do is this, and there is one element that has not been discussed, I am concerned for these things.

One, we have tens of thousands of nuclear weapons stored at one place or the other around the world.

Two, I think this committee, as the developer and supplier of material, has some responsibility to weigh and assess the relative merit of these weapons. I know of no way to do that except perhaps to have some insight, even some testimony or briefing on when they might be used and what the potential reaction to their use might be.

The next point I am going to make is cost. The last point I am going to make is the one I don't intend to discuss at this time. That is tens of thousands of weapons deployed here and around the world which creates a problem on the security of those weapons which troubles me to an extraordinary extent.

At some point, I think we ought to get into that because that is clearly within our statutory responsibility. I don't want to make a big issue of it except to say that I welcome the suggestion that Mr. Hosmer made and Mr. Hansen endorses and the chairman feels sympathetic to, that you find a way to give us that background information on which to weigh and judge and make assessment of the priority to manufacture and employ the devices for military uses. I am not trying to do anything except to get a basis for making that judgment.

Senator SYMINGTON. Thank you, Senator.

Representative HANSEN. I would like to concur essentially with what Senator Baker has said.

In order to carry out our responsibility, I feel the need for other information in other areas so that I can make these judgments.

I think the record would show that this committee has taken a rather active part in the earlier days in making these very judgments; to wit, the nuclear submarine program. It was this committee's initiative that resulted in the progress we made there. If we have the responsibility which some of us exercise and you have made reference to our extremely productive trip to the NATO countries which I think ought to be repeated in due course, some of us were in the Far East recently concerned with the procedures, the safeguards, the potential deployment of nuclear weapons. I feel whether it is in a committee hearing setting or whether it is a joint committee hearing, or whether just individual briefings or trips to the field, I feel the need for this additional information and I would express the hope that in these series of hearings somehow we can get the total picture, including a current briefing on Soviet capabilities so that we can weigh those matters at the same time.

Senator SYMINGTON. Thank you, Congressman Hansen.

Representative LUJAN. I wish you would push vigorously on the security problem that we have all over the world. That concerns me a great deal in view of the briefing that Mr. Murphy gave us here some time ago.

Senator BAKER. It was as a result of the briefing that Senator Pastore and I visited a number of places in Western and Central Europe just a month ago, to follow up on his report.

Representative LUJAN. I have great concern that at some place we have weapons which just a few men are guarding.

Senator SYMINGTON. Sometime back I was impressed with a trip that Congressman Hansen and I made, with Congressman John Anderson, Senator Pastore, and Mr. Murphy representing the staff, in the spring of 1971.

We saw this superb new development called PAL. I asked the staff was it in the Far East. They said, "Yes, it is all over the world now." I said, "Well, check it so we will know for sure."

"We don't have to check it, we know it."

I said, "Check it."

They came back and said, "How did you know?"

"How did I know what?"

"It is not all over the Far East at all."

I then wrote a letter to the Pentagon and they wrote a rather circuitous letter. Now the system is in everywhere, at least some are told.

This bears out what you are talking about. I did not ask for this assignment to Military Applications; I did ask for chairmanship of the Security Committee. Senator Pastore and Senator Baker went over to Europe. Then Senator Pastore said, "I want to be chairman of that committee. I want you to take military applications." That is why we are having these hearings this morning. I worry about the subject the able Congressman from New Mexico brings up.

Representative LUJAN. I have a feeling it is not as secure as it should be.

Senator SYMINGTON. Nobody ever was hurt by the truth. Let us develop facts in these hearings. We know we are having problems with our economy primarily because of the billions upon billions of dollars we are shipping out of the country.

Based on facts, we can come to some right conclusions.

General, we got off your testimony.

General GILLER. I would propose to leave what we have entitled "Tactical systems" and go to the naval system to complete our picture. This is other than submarines.

There are four antisubmarine warfare systems in existence, Astor, Lulu, ASROC, and SUBROC. They are older systems, as you can see, in the sense they came in 1960 to 1964.

One is a torpedo, the Astor. The Lulu is a depth bomb. ASROC is a surface-to-sub rocket. The last one, SUBROC, is a sub-to-sub or shore.

These four systems are not employed on all Navy ships. It depends on the ships. I won't go into the structure. These four are employed for that purpose.

Our next chart shows the numbers. We see in the case of Lulu, one of them went out of the stockpile between 1960 and 1970. The

other ones came in. Some change in the stockpile mix, depending on target and carriers.

The total has remained essentially at about 2,100 and ends up at [deleted]. It is actually [deleted] from the present time.

Senator SYMINGTON. Your page 17 shows a total which does not quite add up with some of the figures you are giving.

General GILLER. In 1973, they do have an apparent contradiction. The charts don't correlate. What should be on page 17 is the depth bomb which makes up the difference, whereas, the total of [deleted] in 1973, today, is the proper number for all antisubmarine warfare weapons. I would have to correct that sheet. That gives you an idea of the antisubmarine warfare systems.

They also have ship-to-air missiles. These are fleet air defense systems, Talos and Terrier. They are older systems, 10 or 12 years old. Both are in same yield range and used for antiaircraft defense primarily. They have two different types of guidance. Again, they are mixed in the fleet and different ships have different ones. I did not try to get into the breakdown.

The number is shown on the next chart where we have the number of Talos (W30) has gone [deleted] over the decade. Terrier goes [deleted] for a total of [deleted] in 1970 to [deleted] in 1980.

The number of fleet air defense warheads are drifting down slowly with time.

I will leave the Naval Systems and go to what I call Air Defense.

Senator SYMINGTON. Before you do that, is there any ballistic aspect to the Phoenix missile?

General GILLER. I don't think so.

Mr. CLARK. A nuclear warhead has been considered for Phoenix but that has never really reached fruition.

Representative LUJAN. Why are we reducing the number of air defense missiles?

General GILLER. These are for the fleet. This is in defense of ships at sea.

Representative LUJAN. My question is, "Why less"?

General GILLER. I am afraid I cannot answer it.

Mr. AGNEW. The fleet is probably more concerned with the cruise missiles rather than an airplane delivering a bomb threat.

Mr. CLARK. The antisubmarine warfare and fleet air defense questions have been given considerable thought in DOD. The question of putting nuclear warheads or the number of warheads required for these has changed over a period of time.

In the mid-1960's, there were considerably more of both than there are at the present time. This has to do with their consideration of how they will fight the war situation at sea.

General GILLER. I would suggest it would be much better to ask a senior member of the Navy how this is operationally configured because this is very complex.

In the air defense area, we have two weapons. One is the Genie, it is an aircraft missile. It is an older one from 1957, a few kilotons. The Nike-Hercules is a ground-to-air system. It has three yields which are interchangeable. It is a guided one. It is deployed in NATO as well as in the United States. Genie is deployed only in the United States.

I think there are also some in [deleted].

Senator SYMINGTON. Gentlemen, before anybody else leaves, it is clear we will not be able to complete these hearings this morning. So, we will meet this afternoon at 2:30.

General GILLER. For the other defense systems which are not an air defense, there is an ABM system. I remind you where that stands now. It is made of two parts, Sprint and Spartan. One has a range of tens of nautical miles, the other one several hundred nautical miles. One has a CEP of [deleted] the other is [deleted]. One has yield in kilotons range and the other is in megatons.

Summing up all of the defensive weapons, air defense and ABM on the same sheet, it shows back in 1961, we had a large number of Genie's and Nike-Hercules. They have been retired and are being retired over the years to about a little less than [deleted] of their 1961 total.

It shows Sprint and Spartan at [deleted]. There are actually 100 launchers, of course.

The overbuild is for test purposes only.

Representative McCORMACK. Where are the Nike-Hercules located and where will they be located in the future, generally?

General GILLER. There are a number of defense sites in the United States that are nuclear capable and there are in NATO a series of Nike-Hercules. For example, there are some in [deleted]. I don't have them in my head at the moment.

Representative McCORMACK. These are defending establishments?

General GILLER. In the case of the United States, they are primarily city defense, Long Island, for instance, or Washington. I believe there is one at Rockville, Md.

Representative McCORMACK. Thank you, Mr. Chairman.

Senator SYMINGTON. When was the Nike-Hercules laid down? I know it was after the Nike-Ajax.

General GILLER. In 1958, the numbers of warheads in the air defense stockpile leveled off at about several thousands. We don't have a projection beyond 1980. I propose to stop as far as specifics on systems are concerned and discuss total trends, such as stockpile totals and what has happened to them over the years to give you a little better feeling of what Senator Baker was referring to as some sort of overview.

My next viewgraph is one that tries to show the change in mix with time for the total number that are now in stockpile. The top of the line is the total U.S. inventory, the world inventory at that moment. We have broken them down for the purpose of showing them on the chart.

The strategic reentry vehicles, Triad, primarily, are shown along with air and missile defense systems. The blue is essentially the tactical systems and the red at the bottom is the Naval Systems we have discussed.

We see the number of tactical weapons has been drifting down slowly. The number of air and missile defense systems has reduced quite dramatically from the mid-1960's and has been replaced by an increase in the strategic system, i.e., the RV's. If we did not have MIRV's, of course, that top line would be a lot lower.

The increase in strategic warheads is essentially the product of MIRV'ing; that is the wide band on the top. The maximum we have ever had in the United States was in 1965, about [deleted] weapons.

We are now at about [deleted] fairly level, climbing a little bit due to the MIRVing, offset by the reduction in other systems. That gives you a feel for how it has changed. Back in the late 1950's, there was a large buildup. Now, that gives you an idea of what has happened over the years.

The next chart gives you an idea of what kinds of fissionable material this weapon stockpile has required. As a result of advances by Los Alamos and Livermore, which has meant that the Department of Defense can count on smaller weapons, special yields, special purpose weapons, which provides a variety of weapons provided our forces. [Deleted] These advances, therefore, permit larger yield-to-weight ratios, which in turn permit smaller delivery missile.

The amount of tritium and plutonium in the stockpile has been increasing. This chart attempts to show the combination of plutonium and tritium as if it were one reactor product. They are both made in Savannah River reactors. It shows where we stand today by the yellow vertical bar at [deleted] kilograms of plutonium equivalent.

By 1980, we will be up to [deleted]. The primary difference between those two is the amount of tritium and plutonium going into the MIRV program. These materials will be going into the finish of the Poseidon and Trident build.

The "other land systems" are shown in blue. You can see the increase from 1978 to 1980; this would be for the 8-inch shell where we are putting in plutonium and taking out uranium. Therefore, trading this uranium for plutonium would show up as an additional plutonium requirement for the stockpile.

I remind you that we have tritium in the stockpile and in our weapons and the decayed tritium must be replaced periodically. We also use tritium in our test program. On the average, [deleted]. That gives you one way to look at the plutonium requirement. In another way, the next viewgraph breaks it down by systems so that you can see what systems it would be invested in. The W68 is the Poseidon warhead. The W62 is the Minuteman warhead. The W69 is the SRAM. These systems make up the Triad. Based on today's requirement, our additional requirement by 1975 would be thousands of kilograms. This is an addition to the amount of plutonium in the present stockpile. This particular chart shows only the additional material required.

Senator DOMINICK. Would you go over those names, rather than the alphabetical ones?

General GILLER. The W-68 is the Poseidon MIRV. It is going on the Poseidon boat today. The W-62 is the Minuteman warhead, another MIRV system. The W-69 is the SRAM which is the B-52 carried missile. There is a small amount in there for the ABM, that is, Sprint and Spartan.

Now, if we were to build the 8-inch shell and the 155 millimeter shell, that is the W-75 and W-74, you will see that these alone require about [deleted] for the two shells.

Remember, you get back [deleted] of uranium. One shell is almost a replacement for itself.

Now, in the case of Trident, since the weapons will be returned from the old Polaris boat, these are net numbers. The Trident warheads would require about another [deleted]. One reactor at Savannah River turns out [deleted] a year, if you have three running there and one running at Hanford, this gives a total of about [deleted] a year.

Therefore, we are talking about 4 or 5 years of running the present complex. This gives you some idea of the fissionable material requirement yet to be met by the production reactors in the AEC complex.

Representative LUJAN. Could I ask why we are doing both the 6- and 8-inch? Is it because that artillery exists? If that is the reason, would it be cheaper to just standardize it at one piece of artillery?

General GILLER. There are two artillery tubes in the U.S. inventory, 8-inch and the 155-millimeter. These are in the hands of our allies, also. It is a tremendous investment. These shells which we have in the stockpile today fit in these tubes. The new shells will fit in these same tubes, also. It is a replacement in kind to obtain advantages that we described earlier such as [deleted].

[Deleted].

The other one takes [deleted] and during that time, the target could disappear on you.

Another advantage is the improved control options available which were discussed earlier. This whole series of advantages shows why the Department of Defense wants to replace the old shells.

The next chart shows what I was talking about in regard to the reactor output and requirements. The black line shows the program requirements as stated on a previous chart. The red line is the output of the Savannah River and Hanford reactors where each year you add another [deleted].

Senator SYMINGTON. Could I ask a question there?

Are you saying we do not have available the ability to handle our requirements?

General GILLER. The red line, the one on top of the black, shows we do have availability until 1980. If we follow the program requirements as outlined the present four reactors would not meet requirements at that point in time. Now, there are other ways—

Senator SYMINGTON. Where does that program come from?

General GILLER. This program is the one that is mainly from the Department of Defense.

Senator SYMINGTON. Who is involved?

General GILLER. I will skip ahead, sir. This viewgraph shows how the stockpile for the next 3 years is generated. When I talk about something 8 years away, my crystal ball is not better than yours, sir.

Every year, the executive branch goes through these determinations for the next 3 years.

Senator SYMINGTON. Please read them out.

General GILLER. JSOP, which is the joint strategic objectives plan, is a JCS-generated document based on the field commander's requirement. This means that the commander in chiefs of the Unified and Specified Commands around the world send in their requirements. Normally, it exceeds what is probably going to be available.

The Secretary of Defense gives strategic and fiscal guidance to the JCS. He says, in effect, your budget shall be so much. A joint forces memo is produced based on this guidance which is fiscally constrained. The AEC also provides information on available material based on a program of running four reactors, and the plutonium availability is therefore constrained.

For example, so they do have a dollar restraint on how many missiles they are going to buy. They know how many kilograms of plutonium

are in the U.S. stockpile for which they are entitled to use for planning purposes.

Senator SYMINGTON. Would you repeat that one, again?

General GILLER. The JCS produces the document called the joint forces memo (JFM). They are informed as to the number of dollars available to meet their mission requirements. The AEC provides them the amount of fissionable material they can count on being available for the total weapons stockpile.

Senator SYMINGTON. Who gives them that figure?

General GILLER. The fiscal guidance is from the Secretary of Defense.

Then, a draft recommendation is made on the stockpile for the next 3 years in great detail. This is a large document with considerable information. It contains all weapons which are to be recommended to the President.

The document is then sent to the AEC for concurrence. It is jointly signed by the Secretary of Defense and the Chairman, Atomic Energy Commission. The DOD essentially asks the AEC to join them in concurring with their recommendation to the President on the stockpile composition. Then the recommendation goes to the NSC for review and final Presidential approval.

This document provides us with the authority for long leadtime procurement for manufacturing. Since we have a 3-year manufacturing cycle, we must have authority for long leadtime items. We get a three-year authorization, updated once every year.

This is the way the total number stockpiles are generated at the present time.

Representative HOSMER. Mr. Chairman, I have a further question about this plutonium requirement. Would you put back the previous graph? As I understand it, by the time you get out here toward the end, you are going to need additional plutonium. [Deleted.] In the case of the 8-inch, it is a uranium-for-plutonium interchange. Furthermore, this particular planning number shown on the chart includes more than a [deleted].

JCS has shown a considerable interest in trying to get the number of [deleted] shells up over the [deleted] level, namely [deleted]. Whether that will come to pass is another matter. As we approach 1977, it will have to be decided whether or not we will wish to invest that much plutonium in those shells. They also have the option of removing it from weapons already in stockpile or from the startup of an additional reactor.

Representative HOSMER. They are talking about a [deleted]?

General GILLER. [Deleted.]

Representative HOSMER. That is a lot of plutonium.

General GILLER. We are pretty far out on the planning graph and it is subject to a lot of change between now and then, I am certain.

Now, in regard to or alloy, the chart shows you how we stand today. [Deleted.] This is predicated on the return of the uranium in the 8-inch shell as well as some of the other systems. This return more than offsets the cost of the plutonium required.

Senator SYMINGTON. What percentage of the amount of available material is taken up by 155-millimeter and 8-inch shells?

Mr. CLARK. [Deleted.]

Senator SYMINGTON. Let us add the uranium together with the tritium and plutonium and your whole nuclear capability in percent of—what percent is taken up?

Mr. CLARK. [Deleted.]

Senator SYMINGTON. You plan to use plutonium in the place of enriched uranium?

Mr. CLARK. Yes, in the 8-inch shell.

Senator SYMINGTON. Would the figure of [deleted] hold true in the case of plutonium?

Mr. CLARK. [Deleted.]

Senator SYMINGTON. About [deleted] of the material available is for the two shells?

Mr. CLARK. It is very difficult to add uranium and plutonium. They are two different things.

Senator SYMINGTON. I understand. You have to have one or the other in this business.

General GILLER. We are often asked about retirements and builds.

The next viewgraph attempts to show the nature of our manufacturing rate and our retirement rate as viewed over a period of some 20 years. [Deleted.]

The retirements are those weapons which are returned from the Department of Defense as a result of the 3-year authorization plan. Each time we make one of these 3-year plans, it provides for certain weapons being returned the following year.

If you were to break down the dotted line on the graph, which is the retirement line, you would see various weapons returning to the AEC for salvage. It varies considerably from year to year, depending on operational requirements.

The Department of Defense does not like to retire an old weapon until the new one is in its hands which leaves us usually with a 6-month lag.

Senator SYMINGTON. Is there any justification to the comment they don't like to give up the old ones even after the new ones are in their hands?

General GILLER. I don't think that is a fair comparison.

Senator SYMINGTON. There has been talk about the fact when new weapons are supplied, the old weapons are not retired.

General GILLER. Since they are restrained in the amount of fissionable material available for them, there is considerable pressure for the DOD to return these weapons in order to get their new ones, otherwise they won't get them.

Some field commanders may feel they would like to hold on longer. But the long-range planners in Washington want that material back as much as anyone else.

Senator SYMINGTON. So, where there was deployment abroad, in nearly all cases when a new one went in, the old weapon came out; correct?

General GILLER. Yes, in the case where the weapon replaces the same military function. If we send a weapon for a new function, then there would probably be no retirement.

Senator SYMINGTON. It then would not be a substitution?

General GILLER. No, sir. It is an addition. In some places, the number of weapons actually increases in an area. In other places, it decreases.

Senator SYMINGTON. I am glad to get that understanding.

General GILLER. You have seen all the different Mark numbers. There are Mod numbers which we have not discussed which are really minor variations. With changing of operational bases, the closing of bases, movement of forces, there is considerable movement of weapons back and forth between bases so that in a general sense it is very difficult to make a statement on their precise location that is completely accurate.

The next chart shows a very simple view of the total megatonnage in the stockpile. As you can see, it has decreased steadily over the years. In 1963, we had tens of thousands of megatons in stockpile. Since 1970, we've had several thousand megatons.

This is mainly because we retired the big blockbusters from the Strategic Air Command aircraft and the MIRV's carry smaller warheads than their predecessors. The stockpile megatonnage levels off at this figure from 1971 on.

So, that gives you some historical trend in the megatonnage of the stockpile.

We have discussed how the stockpile is arrived at in numbers. The next viewgraph gives you an idea of the deployment by area. There are [deleted] in Europe. That is McNamara's 7,000. The Navy has [deleted]. We have [deleted]. These are probably all Genie, air defense weapons. There are [deleted] in the Pacific and [deleted] in the United States.

Senator SYMINGTON. Where are those [deleted] in the United States located?

General GILLER. They would be for instance at certain SAC airplane bases, Minuteman sites. The Navy has a number in their storage sites in support of their submarine fleet as well as at sea, also some are in the surface fleet.

The air defense weapons are scattered throughout the United States. There is a reserve of some tactical weapons which are for Europe, but are in the United States. If you were to break down the tactical weapons locations, you would find they are not all in Europe, but some are in the United States.

Senator SYMINGTON. For the record, will you supply a little more detail?

General GILLER. Yes, sir.

Senator SYMINGTON. The locations.

[Material supplied for the record is as follows:]

[Deleted.]

Representative LUJAN. Are those [deleted] for the United States?

General GILLER. They are for protection of the North American Continent and they are under control of NORAD. [Deleted.]

Representative LUJAN. Are they in the Western part?

General GILLER. [Deleted.] I would like to supply for the record where they are. They are part of NORAD, under their command and control.

[Material supplied for the record is as follows:]

[Classified matter deleted.]

Senator SYMINGTON. Does Canada pay part of the cost?

General GILLER. [Deleted.]

Senator DOMINICK. On the Pacific weaponry, are you excluding from that [deleted] whatever may be in the naval ships in the Pacific?

General GILLER. Yes, sir. They are land based.

Senator DOMINICK. If it is land based, what are we talking about?

General GILLER. For example, we are [deleted].

[Deleted.]

There are also the weapons afloat. I don't happen to know where at the moment.

To review where they are in Europe is very complex. [Deleted.]

I did not try to break down all the individual sites because there are over [deleted] sites.

Representative LUJAN. Do the Russians know where all of these are?

General GILLER. Most of our stockpile sites have characteristic fencelines, lighting, and communication facilities. I would imagine they know where most of them are. [Deleted.]

Representative LUJAN. Why is the chart marked "Secret" if they know?

General GILLER. The numbers they do not know, I believe.

General CAMM. Furthermore, we have other types of munitions in other depots. It may confuse them. I would say they probably don't know precisely where they are.

Representative LUJAN. Do we know where theirs are?

General CAMM. [Deleted.]

General GILLER. [Deleted.]

I recommend you get the Intelligence people to give you a better briefing on this.

That finishes our description of the worldwide numbers, deployment, and the systems that carry them.

What comes next is some weapons effects, some collateral damage discussion, new ideas on safety, security, and command control.

Senator SYMINGTON. Is this a good place to stop?

General GILLER. I think it is a very good place to stop.

Senator SYMINGTON. We will resume at 2:30.

Senator DOMINICK. Could I ask a question before we recess?

Senator SYMINGTON. Yes, indeed.

Senator DOMINICK. We have nuclear weapons now deployed in a variety of different areas of the world. Do the Soviets, as far as you know, have any nuclear weapons deployed outside either the Soviet union or their bloc countries?

General GILLER. Other than the obvious answer, submarines. [Deleted.]

Senator DOMINICK. Thank you.

Do we know how many they have?

General GILLER. [Deleted.] We know they have a very large enrichment facility and plutonium production capability. They have an active test program and a very large R. & D. program, which is still very active.

So, there is no reason to believe they can't have all they want, that is, all they decide they want. They are entering the world enrichment market now, meaning they are releasing uranium for public consumption, which means they have satisfied at least their weapons uranium requirements. I am not aware that they have entered the world market in plutonium.

Senator SYMINGTON. Are there further questions?

Thank you, gentlemen. We will see you at 2:30.

[Whereupon, at 12:20 p.m., the subcommittee recessed, to reconvene at 2:30 p.m., the same day.]

AFTERNOON SESSION

Senator SYMINGTON. The hearing will come to order.

General Giller, we were much interested in your testimony this morning. Will you proceed?

General GILLER. Yes, sir.

We had just finished discussing the total U.S. stockpile and its location.

We now propose to discuss with you some ideas concerning the proper selection of yields for tactical targets in this case and discussion of collateral damage which is reaching a very important stage in our future weapon decisions.

I have borrowed a few viewgraphs which the Army in Europe has put together relating to a study of an array of some [deleted] hypothetical representative targets. I am unable to give you what the [deleted] targets are specifically, at least from memory, but they will include for instance air fields, rail yards, IRBM's and underground sites.

It turns out that if you take this target array and ask how many of those are soft and how many are hard, they break into two classes.

The blue class shows you the rail yards, that is, really the railcars and airfields with the airplanes parked on them and surface-to-air missile sites.

It turns out about 52 percent, or half of them are hard, therefore, for every 100 targets, 50 of them would be in this general class.

Over to the right in the red are shown the IRBM sites, the lines of communication, which are really POL, logistic lines of communication, and rail choke points. In this case you are attempting to destroy the rails themselves, and underground command and control facilities.

The vulnerability numbers shown on the bottom are used to describe the hardness, that is, how much force it takes to completely disrupt these targets.

What we learn from this mainly, is that we have half our targets relatively soft and half are relatively hard. It tells us nothing about the area of the target, the CEP or the yield, but it does tell us something about the general classification of targets.

Taking the [deleted] targets used here and with the yields in this case appropriate to Pershing, such as the [deleted] and using a representative CEP of [deleted] shown in the blue box, it gives you the number of weapons per target required to get the damage expected. This is given on the right.

It shows that the damage expectancy can run very high. [Deleted.] Damage expectancy is completely tied to that CEP.

[Deleted.]

Senator SYMINGTON. [Deleted.]

General GILLER. [Deleted.]

Senator SYMINGTON. That is in the nuclear tactical attack.

General GILLER. [Deleted.]

Senator SYMINGTON. You have yourself in a sort of interesting bind there. [Deleted.]

General GILLER. [Deleted.] These yields are relatively very large.
 Senator SYMINGTON. Have the Germans been very enthusiastic in approving this plan?

General GILLER. [Deleted.]

Senator SYMINGTON. Is any other NATO member enthusiastic about it?

General GILLER. I don't know, really, what reactions of the NATO countries are.

Senator SYMINGTON. Do you think it would be a violation of security for me to say, for example, that a plan with a small tactical nuclear operation, in Europe, [deleted]. Would it be a violation of security to say that?

I understand some countries refuse to let us dig the holes for the atomic demolition weapons in which we have put so much money. If you can't dig the holes, you can't use the weapons.

General GILLER. For the ADM?

Senator SYMINGTON. Yes. You have a plan, on the soil of our allies. Have they approved it and if they have, what is wrong in publishing it?

General GILLER. I am not familiar with the approval of the host countries regarding the nuclear plans. I am not a member of that NATO planning group or anything like that. I really can't answer because I really don't know. I would point out, though, that this particular analysis is for the use of relatively large yields.

I am going to show you what they can do with the same force and where the yields are not nearly this large and they are much lower.

Senator SYMINGTON. I will turn this meeting over to Chairman Price in a minute, because there is a vote in the Senate.

General GILLER. This shows you that if we could reduce the CEP from [deleted] which is within the state-of-the-art, we can reduce the yield requirements, [deleted] and airburst to the point where we would reduce to [deleted] casualties.

It would be correct to say this is still a considerable number of casualties, but relatively speaking, a lot less than [deleted].

Senator SYMINGTON. How many casualties would you have there?

General GILLER. This would go to [deleted].

Senator SYMINGTON. Only [deleted]? That is still very great.

General GILLER. I should not say "only" [deleted]. This is in the context of a major nuclear war in Europe.

Senator SYMINGTON. I thought you said this was the one that was the minimum.

General GILLER. [Deleted.]

Senator SYMINGTON. How do the Germans feel about that?

General GILLER. I am sorry, I don't know the answer. I haven't had a discussion with them or even the NATO people.

Senator SYMINGTON. Has it been approved by the people in Brussels?

General GILLER. We are reviewing new options. What is currently going on is a complete rethinking within the Department of Defense, and especially the Army, regarding the substitution of new systems for the current weapons which have larger yields. These matters have not been formally proposed for approval.

Senator SYMINGTON. I don't mean to belabor it, but I have heard them say, "We are not going to have any tactical nuclear weapons fired off our land." You come up as the head military expert in the Atomic Energy Commission and present the bad points of using these weapons which is [deleted]. I just wonder if we have some understanding with the Joint Staffs of NATO that these will be used if needed.

Otherwise, we are wasting a lot of money, aren't we? [Deleted.]

General GILLER. Our allies find themselves on the horn of a dilemma in that conventional warfare within their country would create as many casualties as these smaller nuclear weapons will create.

The purpose of the nuclear weapon is deterrence.

Chairman PRICE. Will you develop that point? If you know of such attitudes, why don't you develop that for us?

General GILLER. My personal knowledge of these attitudes is only secondary. However, I will be glad to present my own personal view.

From what I know, the Europeans want the American strategic umbrella to be the ultimate response, the threat to hold over the Russians to prevent political coercion. They want us to say that it is conceivable, at least, by a small percentage, that the United States might employ the strategic umbrella. I feel as time goes on, and with approximate strategic parity, some may feel that the value of the umbrella may be reduced. Therefore, I think tactical nuclear weapons in Europe provide a very necessary counter to the Russian tactical nuclear weapons supporting the PACT. It is my understanding that the allies say they want American soldiers stationed on their soil as visible evidence of their determination. They also want U.S. tactical nuclear weapons stationed there which would lead the Russians to believe that if they start a conventional or nuclear attack, NATO might use their nuclear weapons. This is the essence of deterrence. I think the Russians do not know what our response will be. Therefore, they are deterred by this uncertainty. You want the Russian planner to be deterred by the uncertainty over what the American and NATO response will be.

Under the doctrine of Flexible Response we are encouraged to review the options available in nuclear weapon system technology. It is clear that we can provide NATO with new weapons, which are smaller in yield, lower in CEP, and which have improved warfighting capability. Perhaps we will not require the same total numbers that we have now. Some might be cleaner weapons which will further reduce collateral damage. This variety should produce a higher degree of deterrence. It seems that this deterrent value becomes even great because the Russian planners feel that NATO has the option of using them if they are pushed to the wall by conventional attack.

Remember, we are only talking about responding to a major attack on NATO by the PACT forces. NATO is not in an offensive position, only in a defensive posture. We can make these nuclear weapons small enough so that the casualties from conventional warfare in some cases will be higher per target attacked. As an example this would apply to conventional area bombing and to artillery barrages.

For instance, the artillery barrage might create more casualties on some targets than a single, small nuclear weapon. So, there is a crossover point.

Chairman PRICE. It would take an awful heavy artillery barrage to cause [deleted] casualties.

General GILLER. No, sir. That [deleted] is for [deleted] different nuclear targets.

This study that I showed earlier is shown another way here. [Deleted.]

By using future CEP's and air burst only, we can reduce the fatalities to about [deleted] for a total yield of [deleted].

Chairman PRICE. What weapon are you talking about? Are you talking about the shell?

General GILLER. This would be a surface-to-surface missile, such as the Pershing.

This would also be true for smart bombs or for the artillery shell. It really is not dependent on the delivery system. It is dependent on the CEP.

Chairman PRICE. What average?

General GILLER. This class of target would require some short-range deliveries and some long ones.

Chairman PRICE. Like what?

General GILLER. Five miles to several hundred miles.

Chairman PRICE. At 5 miles, we would lose a lot of our own people, within a 5-mile range?

General GILLER. This particular study was on [deleted]. It would also apply if fired on our own soil.

The casualties depend on the population density. This study covered a range from a few miles to 400 miles beyond the front. The smaller artillery shells can be fired very close to the front lines and therefore fill in the range gap.

Chairman PRICE. What was your answer to the Senator when he asked whether or not you would make a statement to the effect that the use of these weapons over there would result in [deleted] casualties. What would your reply have been to him on whether or not that would be a breach of security?

Why would not your answer have been, in your opinion, [deleted].

General GILLER. If, through disclosure of contingency plans, targeting and everything which would tend to raise that specter then the situation occurs which you described, [deleted].

Chairman PRICE. Isn't it the fact that the main reason they are there is the deterrent effect?

General GILLER. Yes, sir. The purpose of nuclear weapons in Europe is a deterrence against the Russians ever starting conventional or nuclear attack. The Russians have to be convinced that the Americans and NATO believe nuclear weapons war tactically useful. Our allies also need to be convinced they are a credible deterrent.

Without these deterrents in Europe, it seems to me the NATO countries might be subject to political dominance due to the very large number of conventional forces in the pact countries.

It is my understanding that there are a large number of troops in the pact countries. SACEUR would be much more qualified to discuss this aspect than I.

Senator SYMINGTON. If the host countries in question don't agree we can use the weapons, should we keep the weapons there, because we would have quite a problem on our hands?

General GILLER. It is my understanding that the host countries want the weapons there for flexible response. They want to consider they have them available if necessary.

I want to emphasize conventional overrun of Europe would create a tremendous number of casualties in itself. For example, the casualties in World War II ran into the tens of millions in Europe.

Our allies are therefore faced by the dilemma in considering the use of nuclear weapons. What we are suggesting here is that technology can provide a sharpened nuclear sword with a lot less attendant casualties but certainly not without casualties. It is impossible to fight such a war.

As Chairman Price discussed earlier, an open discussion of the maximum consequences of a major nuclear war would serve little purpose. This was also pointed out earlier regarding the leak of contingency plans. This could cause the loss of our deterrent structure. This does not apply to the open discussion of new technology which provides options which will reduce undesirable collateral damage and side effects.

Senator SYMINGTON. You don't have a deterrent factor if you don't know whether or not you can use the nuclear weapons.

General GILLER. I believe you have a credible deterrent if the Russian planner is uncertain of your intentions.

If he starts the war conventionally, I think the last thing I would want him to know is that I never would use my nuclear weapons.

Senator SYMINGTON. Suppose you go to a neighbor's farm and say, "I would like to put my horse in your barn. Can we have a steeplechase here, over your land?"

The neighbor replies, "I won't say you can, and I won't say you can't."

Under those circumstances, how do you know what you can do with your horse?

I heard something about this in Germany in November, at the North Atlantic Assembly. They might say, "you can't run that steeplechase over our ground."

What then is the reason to have the horse there? That is what plagues my mind.

General GILLER. I am sure you are aware there are more witnesses who are more competent and more knowledgeable than myself, such as General Goodpaster. I am presently speaking only from my own knowledge.

This little study which we are showing here is an attempt to show that the present systems of relatively large CEP's and relatively large yield might result in a lot of attendant casualties. There is a new group of technology, namely, small yields, small CEP's, perhaps cleaner weapons, which provides one with the same military effectiveness with a lot less attendant, collateral damage but certainly still militarily sufficient.

There is a class of targets on which conventional air attack or artillery bombardment will result in more civilian casualties per target destroyed conventionally than nuclear. Not all targets, but certain ones.

This is really the point I want to make from the collateral damage discussion, that application of the present weapon systems could cause unnecessary collateral damage. If we can reduce the CEP and

the yield, we can destroy the target with a lot less undesirable side effects.

These new systems should be more acceptable because they provide options which allow significant reduction of collateral damage. It is encouraging that the Department of Defense is studying the military possibilities presented by this new technology. [Deleted.]

Some of these weapons do not have the best possible CEP and that is one of the problems.

Senator SYMINGTON. Is the accuracy of the nuclear tactical weapons the Army would use greater or less than the accuracy of the conventional weapons?

General GILLER. The accuracy is the same whether the delivery system is carrying a nuclear warhead or conventional warhead.

The artillery shell has the same accuracy whether it has a nuclear or HE round. In order to be sure to destroy the target, you might fire as many as 100 conventional rounds that could create considerable collateral damage.

If you shoot a single nuclear artillery shell, you might be able to get the same target with a smaller number of casualties, at least comparable to a major conventional barrage. There is a new concept which provides guidance for an artillery shell—it actually guides itself after launch. The CEP would then be even smaller. This small CEP would allow you to use smaller yields.

Senator SYMINGTON. We have had a running fight for years as to whether or not you could have a tactical nuclear war and hold it to tactical only. Do you have any papers in the Atomic Energy Commission that justify the concept we could have a tactical nuclear war that would not evolve into a strategic effort?

General GILLER. No, sir.

Senator SYMINGTON. Is there anything of that character in the Department of Defense?

General GILLER. I am not aware of one that addresses the subject in the way you are speaking. There are a lot of studies, you know.

Senator SYMINGTON. Yes.

General GILLER. I am not suggesting that minimum use of nuclear weapons in Europe will necessarily lead to automatic escalation. On the other hand it is argued that the Russian planner is more concerned about the possibility of triggering off a U.S. strategic attack than anything else. Because he can't control it and he can't stop it, he is deterred from starting anything. That is a popular theory which I feel has some merit.

Senator SYMINGTON. I do, too, but should think this tactical concept operates against that theory.

General GILLER. No, sir. I would say this convinces him that the American and NATO allies feel these tactical nuclear weapons might be employed in Europe. Therefore, he cannot be sure that they will not be employed. You want him to be uncertain as to what our response will be.

Senator SYMINGTON. What we are talking about, in effect, is a graduated response at tremendous expense to the American people.

General GILLER. The rationale is, if you make the first step too large, it becomes much less credible that you will take it. However, if you have a graduated response with a shift from one level to the other

that is much smaller your opponent is much more uncertain whether you will take this step if pushed too hard. I feel there is a good possibility that when these new concepts have been thoroughly studied they will not prove to be a tremendous expense to the American people over the long run.

There are both schools of thought and I will leave the subject at this moment, sir, with your permission.

Senator SYMINGTON. Very fine.

General GILLER. I think we have already said what is on the last chart here. We believe these highly accurate weapon systems with low yields can reduce the collateral damage significantly. The AEC does have new weapon technology that permits these options. If the rationale I am using is appropriate, we can reduce collateral damage significantly with this technology.

We have advances in command and control which we will discuss shortly which permit much greater security for these weapons—for example, against terrorists or demented persons.

The new technology advances should be discussed with our NATO allies and with our military planners and with the Congress to see if such steps are desirable.

I have just described what is often called modernization of the tactical nuclear stockpile.

Senator SYMINGTON. At what step is it advisable?

General GILLER. I believe it is advisable to study carefully the options available so that it will possibly replace as appropriate a number of weapons in NATO Europe with weapons whose yields are much smaller and whose delivery systems are much more accurate, whose security against overrun is much greater. This should result in increased military effectiveness.

[Deleted.]

Senator SYMINGTON. As I understand it then, we can get to the party with an old Packard, but if we have a new Pinto or Mercedes, we can really do a better job getting there, for less money, or less casualties or something than we would with the old bomb. The latter would work, but it is not modern, does not have the right body on it; right?

General GILLER. The analogy you use is very hard to disagree with. I would like to state that I think in your analogy, the old Packard, may be a little slow and we may get to the party after it is over. The engine may decide to need repairing along the way, we would have to stop for that. We may come to a muddy road and the Packard will be stuck.

Senator SYMINGTON. Speaking from personal experience, I doubt the old cars were "worse-made" than the new. But please proceed.

General GILLER. I feel that by changing to more flexible, safer, smaller yield, smaller CEP weapons in part of the NATO structure, we can get better acceptance of them and, consequently, more deterrent value as far as the Russians are concerned I would personally like to see the Department of Defense continue their studies of concepts employing this new technology.

Senator SYMINGTON. You say "a part." What percent?

General GILLER. That would require a fairly careful study with the U.S. and NATO. I do not believe this has been done.

Senator SYMINGTON. Roughly what percent?

General GILLER. I hesitate to make a guess.

Senator SYMINGTON. You can strike it from the record.

General GILLER. My guess would be 50 percent, half of them.

Senator SYMINGTON. What would the cost be?

General GILLER. Again, we don't have any idea of the cost for this. It would depend on the year in which we did it, whether we would have to have a new delivery system or whether we would not.

Senator SYMINGTON. Would you have to have a new delivery system?

General GILLER. In some cases, we might. We might be able to use a conventional precision guided munition system that is already under development as the delivery vehicle. It would be, perhaps, on the order of a couple of billion dollars over the next 10 years or so. It is expected that this would be partly offset by savings. It would not be something you could or want to do overnight. I am convinced it could completely reshape and increase the deterrent in NATO.

Senator SYMINGTON. General, I would ask you a frank question, and then leave it. You are as experienced in this field, from a military standpoint, as anybody. Why this sudden thrust and pressure to get 155-millimeter and 8-inch type of nuclear weapon? Where is it coming from, primarily?

General GILLER. It is coming from the Army, to a considerable extent, but also from a number of other individuals who are addressing themselves to what we do next in the tactical area? Do we stay where they are, do we fold them up and bring them home or do we replace them with something else is the major question.

I believe that a lot of people feel that we must stay in Europe with tactical nuclear weapons and the sword must remain sharp, so to speak, and this is the right way to do it. There is a kind of general consensus, at least, that I run into—

Senator SYMINGTON. As you know, there has been and is heavy pressure to have us reduce our forces in Europe.

General GILLER. Yes, sir.

Senator SYMINGTON. In a caucus, the Democratic Party in the Senate voted 47 to 4 for reduction. That is 10 to 1. Now I notice this 155-millimeter shell won't even be in action for several years.

Is the premise of this whole concept that we are going to stay in Europe forever?

General GILLER. I don't believe so, but I think we shall be in Europe for a long time perhaps even as long as several decades. I believe we should stay until Europe can provide for itself a strong enough military force to withstand the Warsaw Pact.

Senator SYMINGTON. Several decades?

General GILLER. My personal guess would be, perhaps.

Senator SYMINGTON. So far as I am concerned, that is forever.

I was sent to try to persuade the then General Eisenhower to take President Truman's offer of the top job at SHAPE. I told him at that time the consensus of opinion was—this was in the winter of 1950—that the troops would probably not stay more than 18 months.

That is 23 years ago. We had already been there 5 years. Nevertheless, you think they will probably be there for several decades more.

General GILLER. Over the long run you face the problem of what do you do about a nuclear Europe? Do you leave the Europeans

with American weapons, do you encourage them to make their own, or do you want Europe to stand alone without nuclear weapons?

I certainly don't know the answer to that paradox.

Senator SYMINGTON. They don't stand alone without nuclear weapons if we give them a nuclear guarantee, our submarines, aircraft, ICBM's.

General GILLER. It is my understanding that there is no substitute for troops on the soil and nuclear weapons in bunkers for the psychological commitment of America.

Again, I am beyond my expertise.

Senator SYMINGTON. I doubt that. Thank you for this information.

General GILLER. I would propose to leave this subject of collateral damage now, and discuss security and command and control.

To remind you, AEC moves its nuclear weapons from the plant to the first Army or Air Force depot. It is our responsibility to deliver them. They are shipped by air, road, and rail to the depots. We use the C-141 with a special crew out of MAC to deliver the Air Force weapons to their first destination in the United States. We do not deliver overseas from AEC. These crews are specially trained and certified. The easiest place to ship from by air is our plant at Amarillo.

We also move them by road convoy. This is perhaps where we are a little more vulnerable. We have recently put into use a special AEC trailer which is shown in the viewgraph there in the middle of the convoy. This safe-secure trailer is fabricated from an armor-plated standard truck trailer. We have [deleted]. We have constant radio communications with our home base in Albuquerque.

[Deleted.] I think we move nuclear weapons in the United States in about as secure a manner, at least on the road, as is conceivable. This procedure is being used now.

Now, you have seen the next picture. This is just to remind you that we store our weapons in igloos both here and overseas. This one happens to be in the United States. This type of structure is not standard for all places. This begins to touch now on the discussion earlier this morning that Senator Baker raised on weapons security.

The weapons overseas, especially in NATO Europe, are stored in so-called SAS sites, which I am sure everyone has seen. You have inspected the radio communications, the physical security, the guards.

I remind you that these sites are constructed to meet specified U.S. and NATO criteria. The sites are constructed away from populated areas and they are not normally built as part of a barracks. The standard design requires double fences, guardhouse, maintenance buildings, storage igloos, and rapid-response security team backups.

Last year the AEC and Department of Defense went to their field organizations and said, "We want you to inspect and upgrade your system within your financial capability as much as possible."

As a result of this concern I understand that members of the JCAE went to Europe and reviewed in detail those steps that were being taken.

There is some variance in the physical protection features among these numerous weapon sites. Some are located such that they could resist dedicated attacks better than others.

We have upgraded our system considerably. It probably is not necessary to say much more unless somebody has questions.

Senator SYMINGTON. You said, "Within your financial capability;" is there any financial limitation that requires an inferior job, and if not, why did you bring it up?"

General GILLER. Security is like safety. You can spend more and more money for less and less additional increments of security and safety.

Senator SYMINGTON. Are you satisfied with the amount of money you have?

General GILLER. Within the AEC, we have no problem.

Representative HANSEN. Let me raise a question that is pertinent here. This may come under other budgets, but this would appear to be a limiting factor in the upgrading of the facilities [deleted] where some major changes are in process?

Not responding to any urgent need, but in order to comply with applicable standards.

General GILLER. I am sorry, Congressman, I am not familiar with the situation on [deleted] in any detail. I cannot comment. The AEC, fortunately, has smaller permanent bases we have lived in for years and has been able to fix them up, including our production plants.

DOD keeps evolving and moving and they have such a variety of bases of one form or another that their problem is more severe than ours and furthermore, they are in a foreign country.

Representative HANSEN. This would be a Navy facility I had reference to.

General GILLER. From my years in the Service, if you have a genuine concern over safety and security, money can be made available to provide the necessary safeguards.

Now, comes the question of how much. If there is a genuine concern, I can't conceive of their not taking the steps.

I was going to leave this subject of site security and discuss command and control or PAL's and things of this nature.

Senator SYMINGTON. We are all pretty well informed about that. Perhaps you could file it for the record.

General GILLER. All right. I can file the discussion on our PAL, that is, our [deleted] which is the item you see in front of you.

[Material supplied for the record is as follows:]

The requirements of the Atomic Energy Act for custodial control of nuclear weapons have been the basis for the installation of Permissive Action Links (PAL's) on nuclear weapons stored in Europe and designated areas in the Far East. There is a wide variety in the military requirement for the storage, handling, and transportation of nuclear weapons. This varies from storage in earth covered ordnance igloos to nuclear weapons mated on missiles and loaded on aircraft standing Quick Reaction Alert. In order to assure adequate custodial control over this variety of conditions, a Presidential Directive was issued in 1962. This Directive resulted in the installation of AEC-designed electro-mechanical devices installed on bombs and U.S. Army designed

mechanical locks installed on artillery shells and Army operated missile systems. In addition to the installation of PAL devices, the Directive charged the AEC with continued research and development to improve PAL devices. We consider it important that the committee know that PAL research and development has led to technology which will permit significant improvement in custodial control. The application of multiple codes and additional protection provided by techniques for [deleted] are significant because these advances lend themselves directly to safeguarding the positioning of tactical nuclear weapon systems throughout the world. This custodial and command and control technology matches up with the advances in nuclear weapon delivery systems which allow us to deliver warheads on the target much more accurately and therefore apply very low yields and highly specific effects.

That was to be the final portion of my presentation regarding the status of our weapon systems and their deployment and their protection.

I will be glad to try to answer any other questions.

Senator SYMINGTON. I have some questions, but will yield to the Chairman.

Chairman PRICE. Go ahead.

Senator SYMINGTON. General, you described the new 8-inch and 155-millimeter atomic fired shells. To a considerable extent you have answered this, but for the record, I wish you would supply the advantages of this tactical nuclear shell over some of our new precision-guided conventional munitions, such as the TOW designed primarily as an anti-tank weapon.

General GILLER. Yes, sir.

[Material supplied for the record is as follows:]

The TOW is a single target, short range, 3 kilometer, line-of-sight, wire guided missile designed primarily as an anti-tank weapon. The TOW provides virtually no area coverage capability. In contrast nuclear artillery rounds can engage the enemy at much greater distances. They provide area coverage capability with the upper yields, against either tank formations or troop concentrations. Generally, the conventional TOW and nuclear artillery would not be employed against the same types of targets.

In addition, the artillery also provides the capability for the conventional shells in support of a nonnuclear engagement. TOW does not have a nuclear capability.

Senator SYMINGTON. Do you personally believe the United States would cross the nuclear threshold to destroy a tank with a nuclear shell as opposed to using a conventional anti-tank weapon?

General GILLER. Not in a single isolated case, no, sir.

Senator SYMINGTON. How much can be saved in dollars per warhead if the maximum yield of a new 8-inch warhead was restricted to [deleted].

General GILLER. [Deleted.]

Senator SYMINGTON. Will you supply the figure for the record?

General GILLER. Yes, sir.

[Material supplied for the record is as follows:]

[NOTE.—The above figures are confirmed for the record.]

Senator SYMINGTON. Do you know the origin of the decision to build [deleted] 155-millimeter artillery-fired projectiles and [deleted] 8-inch AFAP's?

General GILLER. The [deleted] 8-inch is the initial increment of a build of [deleted] requested by the JCS. Our current plan is for a [deleted] 8-inch shells. Similarly, the number of 155mm is not settled. The present AEC plan is to replace shells on a [deleted] basis. This would provide [deleted] new 155mm shells against the JCS requirement of [deleted].

Any additional build would have to be decided in the future.

Senator SYMINGTON. What is the CEP of the 155mm and 8-inch shells at short, medium and maximum range?

Will you supply that for the record?

General GILLER. Yes, sir.

[Material supplied for the record is as follows:]

The CEP of the current 155mm and 8-inch Howitzer is 40, 100, and 172 meters at short, medium, and long range. A little improvement in accuracy is expected with the new rounds. The CEP's could be 20, 60, and 110 meters, respectively, for the improved 155mm and 8-inch.

Senator SYMINGTON. What is the reason for this particular mix of shells?

General GILLER. The 8-inch and the 155mm complement each other on the battlefield. The 155mm's are further forward in division artillery. There are more of them and they cover the front in a way that is under the command of the forward troops.

The 8-inch tubes are located further to the rear. They command other fire sectors. It is combination of the two that provides the Army with the tactical nuclear deterrent which we discussed earlier this morning.

Senator SYMINGTON. Regarding atomic demolition munitions in NATO, how many emplacement holes have been dug?

Mr. DUFF. [Deleted.]

Senator SYMINGTON. What is your name, sir?

Mr. DUFF. Duff. D-u-f-f.

Senator SYMINGTON. Thank you. What is the position of the German Government re the digging of such holes on their territory?

General GILLER. [Deleted.]

Senator SYMINGTON. [Deleted.]

General GILLER. [Deleted.]

Senator SYMINGTON. How long would it take and what would it take for a knowledgeable person to overcome a PAL and detonate an ADM?

General GILLER. [Deleted.]

Senator SYMINGTON. Is R. & D. being done on an [deleted].

General GILLER. [Deleted.]

Senator SYMINGTON. How would you rate the military usefulness? Do you personally believe the nuclear deterrent would be affected if the ADM's were removed from the NATO stockpile?

General GILLER. I believe, without being a tactician, that the use of a selected number of ADM's at certain parts of the NATO frontline [deleted] can play an important role in war-fighting capability if they were ever needed and therefore would contribute to the nuclear deterrence.

Senator SYMINGTON. Do you believe that the requirement for nuclear weapons by the military would be affected if the cost of the warheads had to be absorbed in the Department of Defense?

General GILLER. I do not believe this would make a very significant change. They must budget for their decision to build a missile, carrier, or aircraft system. The 10 percent of the cost of the nuclear weapons added to the weapon systems cost might require a small stretchout of the program, but I doubt that the total mix would change very much.

Senator SYMINGTON. In this connection, can you tell us if the capabilities of the conventional weapons already in inventory are weighed against the capabilities of the proposed nuclear weapon that would be utilized for the same or similar purpose?

General GILLER. There is currently underway a realization that smart conventional weapons systems should be studied with both conventional and nuclear warheads. This is just beginning. It will be some time before the outcome of this is clear.

Senator SYMINGTON. General, you described the PAL system during the briefing this morning. We have a number of detailed questions on this system.

In order not to take the time of the Subcommittee at this point, we will submit them and we would appreciate your answering them for the record.

General GILLER. Yes, sir.

[Questions were subsequently asked. Answers are provided on following pages:]

Senator SYMINGTON. Has the Atomic Energy Commission, or its contractors, conducted studies to determine the best possible tactical nuclear weapons for use on allied territories?

General GILLER. All three of our laboratories have small study groups that look at various technical ideas that might be of considerable use to Europe. For example, they have proposed the [deleted] and various small CEP systems.

Normally we do only small individual studies. We do not study Europe as a total complex.

Senator SYMINGTON. Have you compared the nuclear WALLEYE and the proposed guided air-to-surface systems with freefall bombs in terms of yields, damage to the target, and possible collateral damage?

If you haven't, will you submit it for the record?

General GILLER. I will submit it for the record.

[Material supplied for the record is as follows:]

The low CEP characteristics of the WALLEYE and CONDOR systems tend to reduce collateral damage by a factor of 10 to 100 when compared to high yield bombs. However, there is a need for the higher yield tactical bombs for use against hard targets.

Further, an all weather delivery capability for the bombs exists whereas WALLEYE and CONDOR do not have this capability.

Senator SYMINGTON. With regard to the delivery systems in NATO please supply for the record the number of shells per artillery tube, nuclear missiles per launcher, and so on.

[The following information is supplied for the record:]

NUCLEAR WEAPONS DEPLOYED WITH NATO

[Deleted.]

Senator SYMINGTON. Do you know how these numbers of nuclear warheads are decided?

General GILLER. The requirements for the number of warheads is generated by the Joint Chiefs, approved by the Secretary of Defense, sent to the AEC for concurrence, sent to the National Security Council and, finally, the President for approval.

Senator SYMINGTON. Is AEC given a chance to comment on the numbers to be manufactured?

General GILLER. Yes, sir.

Senator SYMINGTON. How many retired weapons are still in the custody of the Department of Defense?

General GILLER. There are none left in retirement.

Senator SYMINGTON. For the record will you break this down in how long retired and how much plutonium is in these weapons?

General GILLER. Yes, sir. The answer is none.

Senator SYMINGTON. Re nuclear warheads for air defense weapons, is [deleted] still considered realistic?

General GILLER. No, sir; reassessment has indicated yields in the order of [deleted] to be more appropriate.

Senator SYMINGTON. We will give the reporter the questions on the PAL systems and then I will yield to my colleagues.

Why is the Atomic Energy Commission budget for military purposes about the same each year, year in and year out, \$850 to \$900 million, about 50 percent of the total budget?

General GILLER. This should be considered in the same light as research in the Department of Defense which remains relatively constant year after year at \$7 to \$8 billion. The AEC research, development, and test program takes, roughly, 50 percent of the AEC weapons budget. In addition, there is the amount of money it takes to support a manufacturing complex on a year-after-year basis.

This level of effort is the minimum required to provide for new, improved weapons and the retirement of older weapons. This also is required to support a meaningful research and development and test program to enable the AEC to provide the DoD with important new capabilities.

As a matter of fact the actual level of effort, the total number of people working in this program, has gone down considerably, whereas the cost of living has gone up. There has been an actual reduction in our effort. Over the last few years, we have let several thousand people go.

Senator SYMINGTON. I am not necessarily criticizing, just asking why the figure runs at the same level year in and year out.

General GILLER. If you are going to stay in business your production system will have a large overhead which you cannot reduce significantly unless you go out of business permanently. We have eight plants of which it takes seven to make a few bombs or 1,000. We have a considerable fixed overhead due to the need for extraordinary quality, safety, and security. Therefore, the variable part, or decision cost to manufacture any one weapon type is only a small part of the total allocated cost. The only way you can reduce your overhead is to cut your plant size considerably, as I am sure you are aware.

If we are going to do research, development, and testing, if we are going to work for the future and continue to maintain our production base, there is a minimum price involved. Approximately \$850 million at today's prices is a minimum figure price, I think, to stay in the nuclear game actively.

The Department of Defense has an average budget of \$7 to \$8 billion every year in R.D.T. & E. and this is comparable in nature to our cost.

Senator SYMINGTON. \$8.8 billion.

Chairman PRICE, I understand you may have to go to a meeting. I yield to you.

Chairman PRICE. General Giller, the AEC projects about [deleted] additional weapons by 1980.

What is the date of the most recent weapons physics technology being incorporated in these new weapons?

General GILLER. The 8-inch shell and the 155-millimeter which are under development have the very latest technology.

You see a piece of it in front of you here.

The Minuteman and Poseidon, which will finish their production runs shortly, utilize 5-year-old technology.

The Lance, which is just going into production, is 5-year-old technology.

So, we have a mix, some is 5 years old, and some which are yet to be manufactured will have the newest technology.

Chairman PRICE. What Livermore and Los Alamos development later than 1965 is incorporated in the warheads being built or under phase 3 development?

General GILLER. The 8-inch and the 155-millimeter certainly fit that.

Mr. AGNEW. The Trident warhead will be [deleted]. Then, if we are to restructure the tactical stockpile we should look toward these cleaner, low yield warheads which is a technology we are still groping to achieve.

Chairman PRICE. The weapons we have now are scattered all over the world.

What is the date of the technology in those weapons?

Mr. AGNEW. Usually, it is about 2 or 3 years before this IOC date that was on the chart.

Chairman PRICE. The IOC——

Mr. AGNEW. Initial Operational Capability.

The technology is about 3 years before that.

Senator SYMINGTON. If the chairman will yield, we have not had a new fighter for 20 years. The last was laid down in 1954. I take it, especially if we are running into these heavy costs of Government, and balance of payments, and other financial problems, the question is, can what we have do the job?

I am of course, not opposed to some research and development.

Chairman PRICE. The point I am trying to bring out is whether or not there is some new technology for the weapons, particularly your naval program.

The latest that I see are SUBROC, Talos; some of the weapons for Navy must be around 1958 or 1959.

Have there been any developments since then?

General GILLER. [Deleted.]

Chairman PRICE. I did not know whether it meant anything or not, but Dr. Agnew, you are a laboratory man, does it indicate that they have not been progressing very rapidly in new technology?

Dr. AGNEW. I think the AEC's laboratory technology is sort of ahead of the DOD technology, especially in this field you are talking about, naval weapons.

There have been no naval systems that have warranted the new technology.

Chairman PRICE. In other words, the nuclear technology keeps abreast of the new weapons technology?

Mr. AGNEW. We do two things.

First, we try to anticipate the technology, promote, you might say, new ideas that people have for making weapons either cheaper, smaller, more yield at less weight, size and so forth, and so on.

But our main responsibility, in addition to the R. & D. which the Senator referred to and trying to anticipate what technology may provide, is to be able to provide warheads for whatever delivery systems the various services have that need warheads.

As General Giller said, we are the armorers for the Defense Department in the nuclear field. The Navy, except for the Poseidon Special Projects Office, has not had a system other than Walleye which is for Air Force use.

The conventional Walleye is a Navy-developed glide bomb. The AEC, in their laboratories, pushed very hard to provide a limited nuclear capability in Walleye. Be it very small, I think they only made [deleted] but this is the first time that people realized you could couple a very low yield with a very accurate missile and have a very great military effectiveness.

I think that in part is what has promulgated the idea of reducing these yields to reduce collateral damage.

Chairman PRICE. Thank you, Doctor.

Senator SYMINGTON. I have some questions here the staff has drawn up.

Which U.S. nuclear weapons do not have PAL systems installed and what measure was taken for those weapons that do not have PAL to prevent unauthorized launch or detonation?

Will you supply that for the record?

General GILLER. Yes.

[Material supplied for the record is as follows:]

[Deleted.]

Senator SYMINGTON. Please list the new weapons systems that will have the new PAL's installed, and cover the multiple-coded switch and [deleted].

Will you supply that for the record?

General GILLER. Yes, sir.

[Material supplied for the record is as follows:]

The new weapon systems that will have the new PAL's installed are:

[Deleted.]

Senator SYMINGTON. Are there plans to retrofit any existing weapon systems with new PAL's?

General GILLER. No, sir.

Senator SYMINGTON. Do you consider that the new PAL system enhances security, custody, or both?

General GILLER. Both.

Senator SYMINGTON. What is the minimum time the current PALs could forestall the arming of a weapon?

General GILLER. [Deleted.]

Senator SYMINGTON. What is the estimate for the new PAL devices?

General GILLER. [Deleted.]

Senator SYMINGTON. Would you look your answer over on that for the record to be sure we have it correctly.

General GILLER. Yes, sir.

[Material supplied for the record is as follows:]

[Deleted.]

Senator SYMINGTON. Between now and the fiscal year 1979, the Atomic Energy Commission proposes to build [deleted].

General GILLER. I believe the current planning number is around [deleted].

[Deleted] is expensive. It is \$30,000.

Senator SYMINGTON. This is the first time anybody in recent hearings has said \$30,000 is expensive.

General GILLER. Per bomb.

Senator SYMINGTON. I knew there would be a catch to it.

Between now and beyond the fiscal year 1980, AEC is planning to build [deleted].

In the same time-period, AEC is planning to build [deleted].

Will you tell us why [deleted] are being built?

General GILLER. The basic rationale for the [deleted]. Again, we do feel that [deleted].

Senator SYMINGTON. Would you supply for the record how the new multiple-coded switch PAL is combined with the [deleted] to provide a higher degree of security?

General GILLER. Yes, sir.

[Material supplied for the record is as follows:]

The new MCCS provides several new features not contained in current PALs. These include:

[Deleted.]

Senator SYMINGTON. What could be associated with an attempt to radiograph a weapon by X or gamma rays or neutrons?

General GILLER. [Deleted.]

Senator SYMINGTON. Are there additional new PAL systems under development?

General GILLER. Sandia has some long-range ideas for a replacement for this [deleted] for the purpose of reducing cost. Performance would be roughly the same. Sandia continues to develop the state-of-the-art in command and control hardware.

Senator SYMINGTON. Congressman Hansen.

Representative HANSEN. Let me go back for a moment to one of the questions raised by the chairman relating to the 8-inch warhead.

If the 8-inch warhead were restricted to a [deleted] can it—would there still be a need for both the 155-millimeter and an 8-inch?

General GILLER. The Army has made very positive recommendations for both shells due to the number of 8-inch and 155-millimeter tubes they and our allies already own.

By using both shells, they provide a considerably larger number of artillery tubes that the enemy has to worry about. So they feel both of them are required.

They also have other artillery pieces in their operational capability. I am not familiar with battlefield artillery.

Mr. CLARK. I believe the point is that the 155-millimeter tubes are distributed at division level. There are a significantly larger number of them in the force than 8-inch tubes.

On the other hand, the 8-inch shell is somewhat cheaper in terms of fissile material. It has somewhat greater range over the battlefield.

Consequently, the Army believes, and we believe with them, that both weapons are required and do make a credible part of the tactical deterrent force.

Representative HANSEN. Is it possible to build a [deleted]?

Mr. AGNEW. [Deleted.]

Representative HANSEN. Could this weapon be designed to deliver a neutron dose of [deleted] to a distance of [deleted] from ground zero?

Mr. AGNEW. Yes. It would exceed that.

Representative HANSEN. What would happen to a person who receives an instantaneous neutron dose of [deleted] or more?

Mr. AGNEW. In a very short time, he would become very ill and would be incapacitated; in a day or so he would be dead.

Representative HANSEN. Do you know why [deleted] weapon has not been more fully exploited for battlefield use?

Mr. AGNEW. I really don't know why people have not thought more on the use of these [deleted] weapons.

It may be that people like to see tanks rolled over rather than just killing the occupants. It is quite clear that there is rethinking going on in this as General Giller mentioned.

I know we at Los Alamos have a small, but very elite group that meets with outside people in the defense community and in the various think tanks. They are working very aggressively, trying to influence the DOD to consider using these [deleted] weapons which could be very decisive on a battlefield, yet would limit collateral damage that is usually associated with nuclear weapons.

Representative HANSEN. I would like to ask a question, I am not certain it is within the scope of the hearing, but it seems to me relevant, that is concerning our weapons testing program.

I am interested in your projecting a level of funding for weapons testing that would be adequate to our needs and also your comments on the effects on our weapons programs of any decision to terminate all testing.

General GILLER. Dr. Agnew is head of the laboratory that uses those test funds.

Mr. AGNEW. I think the present level of effort in testing is, in order to do the two things mentioned earlier, one, try to stay ahead of the field, so to speak, exploring new ideas in weapon technology.

Second, to provide the actual testing of warheads that are to enter into the stockpile.

I think that if testing were to stop, then we would not have a capability to design nuclear weapons. I don't think you can have this capability for more than a year or two or may be three, if you don't have an active test program.

The testing is part of the R. & D. program as well as part of the program of getting your assurance of showing that what you put in the stockpile will really work.

It is a vital part of the R. & D. program, the actual testing of concepts and ideas.

Representative HANSEN. Thank you.

Thank you, Mr. Chairman.

Senator SYMINGTON. Thank you Congressman Hansen. General Giller, Colonel Shwiler has several questions he would like to ask.

Colonel SHWILLER. To go back to what Mr. Price was pursuing about the latest technology, which is incorporated in the weapon, if you look over the past 5 or 6 years, 7 years, you will find there are things like [deleted].

Yet, you don't find that incorporated in any of the systems. The closest you have to a new system is Sprint.

Mr. AGNEW. May I talk about that? [Deleted]. If indeed we are successful in getting the yield range which is required for the 155, which is [deleted] that would be done through [deleted] the only way to get that yield. It is the first time that that technology will be applied in the stockpile. It is very difficult, in this case, not because of the nuclear technology, but because of the environment, that is the 155-millimeter launch conditions imposed upon us, the accelerations which are over 16,000 "G's." If you have a 5-pound ball at 16,000 "G's," that is 80,000 pounds, that is 40 tons you have to support. And it is spinning like hell, too.

That is one example. As far as [deleted] when one looks at the improved bombs that people have been looking at, the new FUFO for the Air Force, the only way that one can get the yield they want with diameters they want, is using this technology.

Right now, we are in a dilemma because the arithmetic does not quite agree with the results that we have tested.

Senator SYMINGTON. There it is; in the laboratories, but none of them incorporated in the weapons.

Mr. AGNEW. I am saying, if there is a new bomb, it will go into that particular bomb. That is the only way you can do it.

If there is not a phase 3 requirement, it will not get in.

These things have been developed since the last requirement for bombs. We have not made any new bombs in this country for a long time. The last one, if you want to call it new, is the [deleted] kiloton MK 61.

Senator SYMINGTON. That has come up a couple of times earlier today.

Those who emphasize the Russian menace, which always comes in the spring along with the Japanese cherry blossoms, at the time the defense budget comes up, emphasize the terrible danger from the new big Russian bombs; whereas the United States went the MIRV route, more warheads, even the most ardent advocates of Russian strength will admit we have thousands more warheads than they do.

If we are right and they wrong, why is it they continue to emphasize the big warheads, while we emphasize something entirely different?

Mr. AGNEW. I am not so sure that they are any longer. If you look at their spectrum, they seem to be covering the waterfront.

Senator SYMINGTON. Let me rephrase it this way, then: If it is so important for them to have big warheads and continue with them, why did we abandon ours?

Mr. AGNEW. I think the reason we have is because of our carriers.

Senator SYMINGTON. When you say "carriers," you include—

Mr. AGNEW. Missiles, airplanes, submarines.

Senator SYMINGTON. Not just aircraft carriers?

Mr. AGNEW. No, vehicles for transporting weapons. The number of vehicles we have is less than the Soviet vehicles.

In order to cover the number of targets, our planners would like to cover—the only way is to split the number of warheads, and bombs go down in size and weight. When you do that, the yields go down.

Fortunately, our technology is such that our yields are still very credible.

Also, deterrence is in the eyes of the guy who is going to be deterred. I sometimes wonder if we should not have big bombs. Since the other guy has big bombs, maybe he will be more deterred if you have big ones. I don't know what deters a person.

Senator SYMINGTON. What is deterring me is our economy going down the drain. We can't decide on anything in the way of discrimination, so we build everything.

There was a time when that was an all right way to handle it, because we had \$25 billion in gold and owed only \$7 billion redeemable in gold.

Now we have some \$10 billion in gold and owe \$40 billion.

The proof of that development is the deterioration of the dollar. I am willing to accept your statement, the more we have, the greater deterrence we have; but there comes a time when your economy will break unless you do something in the way of discrimination—decide on what you really need and recognize the logic of a word that is an anathema to the hard line militarists—overkill.

Mr. AGNEW. I believe that if one had a proper doctrine in tactical nuclear stockpile, you can deter much cheaper to stop a war much more effectively than what we have recently experienced in the last 10 years.

Senator SYMINGTON. We are asking for submarines that cost a half billion dollars more than the most expensive nuclear carrier.

Some of us wonder what will happen to the economy of this country if we put this kind of money into one weapons system.

As a former manufacturer, what disturbs me is the consistent way we go into production before we have completed our research and our development. I am not talking about basic research, rather what you do before you risk your own money, or stockholders' money, in production.

Time and again we get caught in these terrible overruns on many weapons; after we have gone into production, we find it is not what we want.

Congressman Hansen, do you have any further questions?

Representative HANSEN. I will say I am much interested in the last comment Dr. Agnew has made and invite him to submit something more for the record bearing on the cost and effectiveness of the use of tactical nuclear weapons.

Senator SYMINGTON. May I say we plan to have Dr. Agnew—we have great respect for him—as a witness. I did not know he was coming today. He can explain anything in this field and has my admiration for many reasons, and that is one. General, do you have any further thoughts in this matter?

General GILLER. No, sir. We have gone through our stockpile and I think we have covered most of the questions that I have heard over the years.

I don't have anything to add at the moment.

Senator SYMINGTON. I would thank you for your tolerance and the fine way you have answered the questions. Please correct anything or add anything so as to get the record more accurate.

I have apprehension about the distance between the Armed Services and Appropriations Committees and this Joint Committee. If we can only work together a little more closely.

Under the rapidly developing circumstances, I think we ought to have more coordination. Mr. Clark, you don't seem to have much to say; but when the questions come up you have the answers.

General GILLER. Tom has been with the program for 6 or 8 years. He was in charge of weapons production staff in Washington. He is my right hand when it comes to an infinite number of facts that I can't carry around.

Senator SYMINGTON. You are a right hand for a good man.

Do you have anything you would like to add to this discussion?

Mr. CLARK. No, thank you.

Senator SYMINGTON. Does anybody else have any comments?

Colonel SHWILLER. Could we go back to testing for a moment?

In talking with some of the real experts in the field they have a problem with the DOD requirements in that they expect them to tell them—to guarantee within 10 percent that a given yield will be as stated.

Yet, when they do the testing their refinement is not much better than 10 percent.

How can we correlate this, and cut down on the number of tests that have to be done to get enough data to give the answers that the people would like to have?

Mr. AGNEW. I don't think the number of tests are influenced much by that. If you write an order you have to put something down for a number.

In a phase 1 or phase 2 group there is a common meeting of minds as to what can be feasible. Then, we take a particular device we have calculated to give a certain yield.

Sometimes we hit it closely on the nose. Other times, we don't. We have to jiggle it a bit, we may have to retest it before we put it in the stockpile.

There is not the sort of jitter or shinnying up in marbles to get close to target. We don't do that. Usually, the yields are given and they are accepted within the requirements. It is not quite as bad as that implies.

Now, there are some cases where we can't get the yields they want. They don't come naturally, so to speak. Especially in these [deleted]. Like the B-61. In that case, we just told them, if you want a high yield, you could not have this other yield. More recently, in some of the modifications, they have dropped the requirement from [deleted].

I guess it is because, if they wanted a [deleted] it took about 90 percent of the enriched uranium in that weapon.

Senator SYMINGTON. When you, Congressman Hansen, and I were in Europe, it was [deleted].

Mr. AGNEW. Right.

Senator SYMINGTON. Now, we have been talking [deleted].

Mr. AGNEW. [Deleted], I think, is the figure.

Senator SYMINGTON. What is the figure now?

Mr. AGNEW. [Deleted]. There is also a [deleted]. That may be where people have gotten mixed up.

What I am saying is that in a new batch of MK-61 bombs, in order to save enrichment material, they have gone along with the yield of [deleted].

There is a dialog that goes along between the AEC and Defense Department with regard to what yields are handled at what cost.

Senator SYMINGTON. If I were in the Pentagon, I would say, "Get me anything and everything, we don't have to pay for it."

Mr. AGNEW. There is one point I don't think you were suggesting, but I would say that if the Pentagon started contracting out to do their nuclear weapons development, their cost would go up by a factor of 10,000.

Senator SYMINGTON. If they trust you, which they do, I don't see why they don't pay you for a warhead just as they pay a manufacturer for say avionics. You are not the Department of Defense; they are. This is all built for them.

We now have this energy problem. When you come back as a witness, I would ask some questions. It would seem the whole atomic energy pitch, especially with the naval nuclear influence, has been primarily military. Yet, we are now running into real problems from a civilian standpoint. You and I have talked about this before, serious problems that have nothing to do with the military; perhaps if there had been more research and development in what you might call these peacetime efforts, we very possibly wouldn't be in the spot we are in today.

Would you comment?

Mr. AGNEW. Maybe it is best left for the next time.

I think probably it is best for another session, but I do sincerely believe that the Commission has done an excellent job in pushing research and development on materials, techniques, designs for civilian power reactors.

I think part of the problem that we are confronted with today is caused by a lot of what I think are fallacious objections that these intervenors are imposing, again at no penalty to them, has caused a tremendous slowdown in the construction of these reactors.

In the same context of your mentioning the Defense Department getting something for free, it seems to me these intervenors who have slowed down the construction of powerplants, at no cost to them, and then when they are proven to be wrong and we have lost 3 years, 18 months, whatever it is, it has cost the Nation again security and the economics of the country a tremendous amount of money in having to import oil, it seems to me those guys ought to have to pay something.

It is a free ticket. If they win or lose, if it is a bright young lawyer, he makes a name for himself.

Senator SYMINGTON. Are you talking about the environmentalists?

Mr. AGNEW. Not strictly environmentalists. They are antinuclear people.

Senator SYMINGTON. These hearings have primarily to do with military applications.

Mr. AGNEW. I am skating on thin ice, but I have strong opinions.

Senator SYMINGTON. What we would like to understand is why we need all these various new weapons in the quantities ordered? We have a very good witness in General Giller today, and appreciate him and his testimony very much.

We are adjourned, subject to the call of the Chair.

[Whereupon, at 4:10 p.m., the subcommittee adjourned, subject to call of the chair.]

